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Submissions

of the

PROVINCE OF SASKATCHEWAN

to the

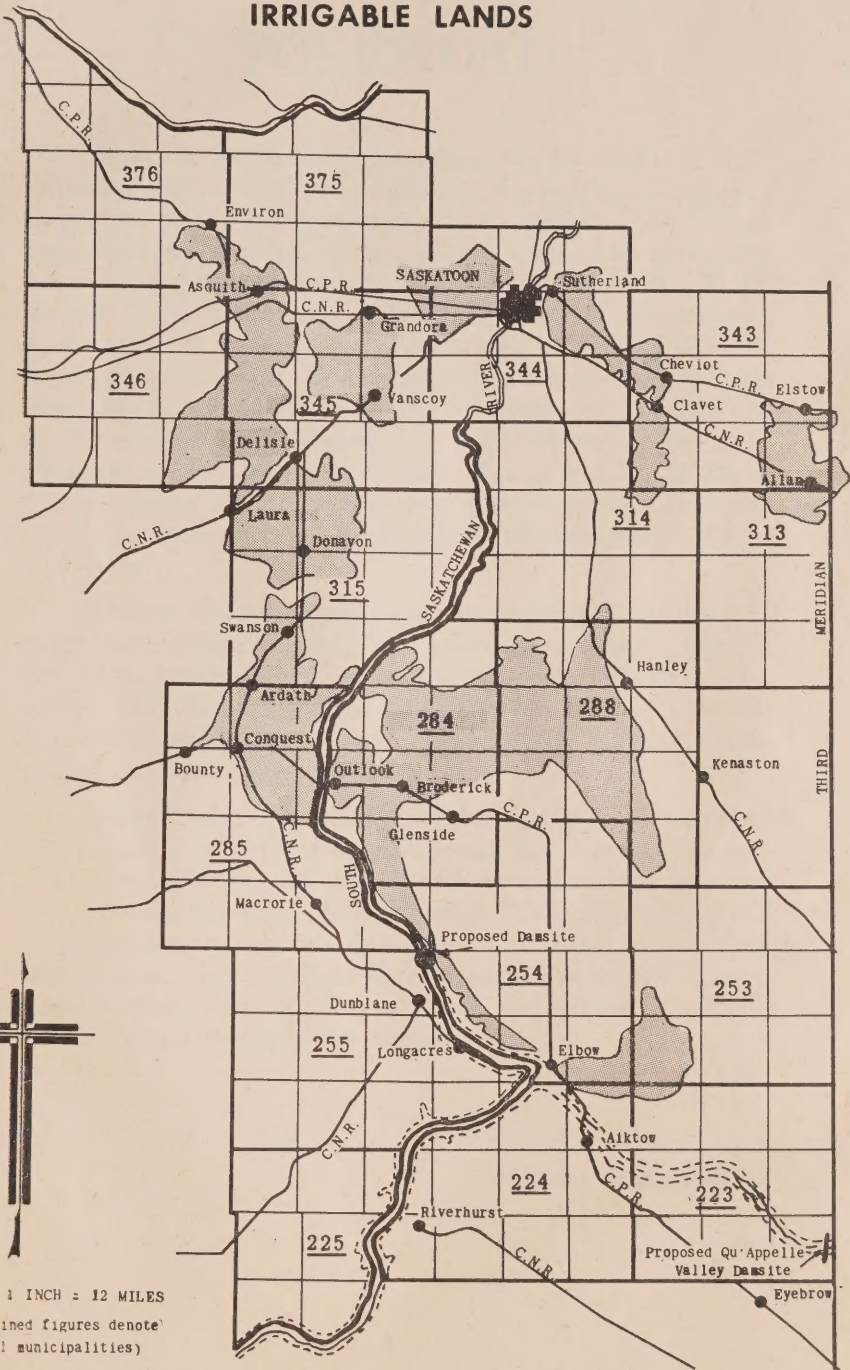
ROYAL COMMISSION ON THE SOUTH SASKATCHEWAN RIVER PROJECT



REGINA :
THOS. H. McCONICA, Queen's Printer
1952



DEVELOPMENT AREA showing IRRIGABLE LANDS



SCALE : 1 INCH = 12 MILES

(Underlined figures denote
rural municipalities)

FOREWORD

The briefs contained in this volume are the results of individual and collective efforts of members of a provincial Irrigation Committee, which has been engaged in a study of the Central Saskatchewan Development for several years. The permanent members of the Committee are: I. C. Nollet, Chairman, W. H. Horner, E. E. Eisenhauer, J. W. Tomlinson, W. B. Clipsham, J. A. Arnot, B. Boyson, R. E. Mackenzie, E. J. Scammell, M. Brownstone, Secretary. In addition to these individuals valuable advice has been rendered by Harold W. Pope, Q.C., Counsel for the Government of Saskatchewan to the Commission, Dr. L. B. Thomson, G. L. Mackenzie, Gordon Watson and W. B. Berry of the Prairie Farm Rehabilitation Administration, Professor David Cass-Beggs, W. H. Harding, T. K. Shoyama and Professor F. R. Scott.

We have also benefitted greatly from technical studies prepared under Prairie Farm Rehabilitation Administration auspices and wish to acknowledge our debt to the many individuals concerned. Without the concerted research effort of these groups it is doubtful whether an objective and scientific appraisal of the project would have been possible.

Finally, I wish to extend the appreciation of the Government of Saskatchewan to the many individuals and organizations presenting briefs to you, and others who have worked hard for many years to make this great project a reality. While largely composed of Saskatchewan residents this group also includes many individuals from other provinces whose support has been of unquestionable value, demonstrating, as it has, the national importance of the Central Saskatchewan Development.

I. C. NOLLET,

Minister of Agriculture.

GOVERNMENT OF THE PROVINCE OF SASKATCHEWAN

September 11, 1952.

DR. T. H. HOGG,
Chairman,

Royal Commission on the South
Saskatchewan River Project,
406 Elgin Building,
Ottawa, Ontario.

DEAR SIR:

I have the honour to present herewith Submissions of the Province of Saskatchewan to your Commission.

You will please note that six separate Submissions are contained, one a general brief, which I will present and the others covering different phases of the project and presented by various agencies of the Government.

I must note with regret two impediments to a complete statement of Saskatchewan's case in these briefs. First, the details of the Commission's cost estimates were not available to the government for study and comment. In fact, the summarized costs which were made available were reserved by the Commission from comment by this government. Secondly, relevant submissions by other governments were also not available in time for detailed comment in the Submissions. Despite these difficulties, it is the intention of Saskatchewan Government representatives to discuss both questions during the course of the hearings. At the same time, the Government of Saskatchewan wishes to discuss the question of costs more fully when the Commission's detailed estimates are made available.

It is the earnest hope of the Government of Saskatchewan that these Submissions will be of assistance to the Commission.

Yours sincerely,

HON. I. C. NOLLET,
Minister of Agriculture.

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Part I

GENERAL SUBMISSION

Submitted by

Hon. I. C. Nolle,
Minister of Agriculture

1. Introduction

The Royal Commission on the South Saskatchewan River Project was appointed by the Government of Canada, under the terms of Order-in-Council P.C. 4435, dated August 24, 1951, and charged with the following terms of reference:

1. Whether the economic and social returns to the Canadian people on the investment in the proposed South Saskatchewan River Project (Central Saskatchewan Development) would be commensurate with the cost thereof;
2. Whether the said Project represents the most profitable and desirable use which can be made of the physical resources involved.

Comparative measurement of costs against economic and social benefits can often be quite abstract and nebulous. For instance, an indication of economic and social benefits as justified by costs might be compared to the fact that the people of Canada in 1951 spent \$1,446,000,000 on alcoholic beverages, tobacco, race tracks, soft drinks and commercial recreation, but the justification of this type of expenditure on the basis of economic and social returns and desirable resource use has not even been questioned by governments.

When the economic and social benefits of irrigation and power development are balanced against capital costs, it is well to be reminded of the fact that water harnessed as a source of energy, unlike other resource energy, is unexpendable both for electric power and irrigation purposes. It is true that costs of public projects have increased materially. It is, nevertheless, also true that as a result of economic expansion and development generally in Canada in recent years, purchasing power and ability to carry costs have also increased very materially. Increased costs have not deterred public in-

vestment in useful public enterprises. Never in the history of Canada have so many public projects been undertaken at all government levels, with many more public projects being planned for the future. In fact, Canada is committed to the gigantic St. Lawrence Seaway. All of these factors must be considered in dealing with the Commission's terms of reference.

In these introductory remarks I would like to outline briefly Saskatchewan's agricultural production problems and the effects of these problems on the provincial and national economies together with a summary of the impact of the Development on these areas.

The total area of Saskatchewan is over 161 million acres, the land area being over 152 million acres, and the area of water well under 9 million acres. These figures clearly illustrate the disproportionate amount of land to water. By far the largest area of water exists in the northern non-agricultural part of the province. The above figures, when coupled with low, uncertain precipitation and a high evaporation factor, leave no doubt that agricultural and economic instability in Saskatchewan is related principally to moisture deficiency.

There are approximately 60 million acres of land covered by soil surveys in the occupied agricultural portion of the province. Of this area, over 33 million acres are under cultivation, or approximately 40 per cent. of the total cultivated acreage in Canada. It is worthy of note that only 7,833,000 acres of cultivated land is classified as "best to very good wheat land" leaving 25½ million acres which require balanced rotations. This acreage, together with an additional 27 million acres unsuited to cultivation, strongly implies increased emphasis on livestock production in the interest of full and proper utilization of land resources

and a stable agricultural industry. Live-stock, in turn, depends on an assured supply of feed obtainable through irrigation development. Thus, an irrigation green spot in the centre of the agricultural area of Saskatchewan will be of immeasurable benefit to agricultural stability.

Saskatchewan is a province of great potential production under favourable moisture conditions. On the other hand, no other province has experienced Saskatchewan's violent and disastrous economic fluctuations. Saskatchewan's production history is marked by drastic fluctuations due to moisture hazards; for example, wheat production in 1942 was 305 million bushels; in 1937, it dropped as low as 36 million bushels; and in 1936, 110 million bushels were produced despite the fact that the larger acreage was sown to wheat in the latter years cited. As a result of these conditions private business and public service, both municipal and provincial, are under a constant threat of disruption. The latter organizations have been and are exposed to the financial burden of relief liability which is shared to an important extent by the Federal Government.

What role has the Government of Saskatchewan played in overcoming our production problems? Let me say, firstly, that the Saskatchewan Department of Agriculture considers the need for agricultural stability to be of paramount importance to a sound provincial economy. In fact, the cornerstone of the Department's agricultural policy is, first, agricultural stability and, second, increased production resulting from good land use practice and optimum development of all irrigation and reclamation possibilities. The Department of Agriculture has directed all its major activities to this end and has increased expenditures with these basic objectives in mind. To make this possible the votes for the Department of

Agriculture have been increased from \$826,000 in 1945-46 to \$3,666,000 in 1952-53.

Part of this increase is reflected in a greatly expanded field extension service for the primary purpose of improved land use practice and the initiation of worthwhile projects which will bring greater security to our farmers. The Agricultural Representative Service covers the entire province with Agricultural Representatives living within their respective districts. The Agricultural Representatives work in close association with local agricultural committees whose principal attention has been focused on Saskatchewan's major problems. Innumerable valuable land use and settlement studies indicating clearly the comprehensive steps necessary to bring stability and security to Saskatchewan agriculture have been made by these committees.

In order to meet present and anticipated needs, the Department has set up a new branch known as the Conservation and Development Branch charged with the responsibility of undertaking physical development of irrigation drainage and dry land projects. This branch itself has an appropriation of nearly \$1,350,000 for 1952-53. It is well to mention that previous to the inauguration of this branch there were no engineering specialists and no equipment in the Department to implement the above programme. Since the establishment of the Conservation and Development Branch, the scope of activities of this branch can be gauged by the fact that 45 water users associations are now organized; water has been brought to 50,000 acres of land; 145 miles of ditch have been constructed; 475,000 acres of dry land projects developed; and 1,000,000 acres of land affected by drainage improvements. Thirty-three field survey parties are in the field this summer. I refer to the activities of this branch merely to indicate that the

Department has a well organized expanding agency staffed with competent technical personnel to meet present and future requirements for irrigation, reclamation and other activities associated with overcoming the many natural hazards facing Saskatchewan agriculture. Trained technical staff, equipment and experience places the Department in a good position to undertake the responsibilities associated with the Central Saskatchewan Development.

I should make brief reference to the activities of the Lands Branch. The administration of Crown lands in Saskatchewan is devised to fit into the general policy aimed towards agricultural stability and security. Provincial Crown lands are utilized wherever possible to establish community pastures, fodder projects of various types, including irrigation, reclamation and dry land projects. Crown lands have been made available for the establishment of P.F.R.A. community pastures, provincial community pastures, co-operative pastures and co-operative community fodder projects, and the establishment of as many economic farm units as possible with available Crown lands. Earned assistance is made available to municipalities or groups of farmers who wish to develop pasture or fodder projects within the resources of such groups, with the Department paying 50% of the actual development costs. Larger projects of this nature are constructed exclusively by the Provincial Department and, of course, as mentioned above, P.F.R.A. has made a very substantial contribution in the establishment of community pastures on Crown lands made available by the Provincial Government. Administration of Crown lands in Saskatchewan is characterized by meticulous inspection by competent soil specialists in order to determine the proper utilization of land for grazing or cultivation purposes, and also to determine the size of a

potential economic farm unit in accord with the productive classification of the land. The Lands Branch exercises every caution against permitting unsuitable land to be utilized for wheat production. The Department is primarily interested in good land use practice and the optimum utilization of our total Crown land resources in order to assist in stabilizing Saskatchewan agriculture and increasing production to the optimum. The Lands Branch has also inaugurated new settlement projects in the limited area remaining in northeast Saskatchewan.

It should be quite clear from the foregoing that this Government, working with federal and local groups, is making every effort to cope with our agricultural problems. What can the Central Saskatchewan Development contribute?

With respect to agriculture, the Development will remove the threat of crop failure from almost 450,000 acres of land which is now extremely vulnerable to drought conditions. It will permit changes in land settlement patterns which will eventually place upwards of 4,000 farm families on a secure and permanent basis. It will allow essential changes in land use both within the project and in a considerable area surrounding the project and will permit widespread diversification in the economy. If this project is not constructed there is little hope of avoiding the effects of adverse climatic conditions on the economy. The only basic solution within agriculture is, firstly, to provide assured feed supplies, and secondly, to provide more land to farmers in the arid areas by resettling a portion of the farm population. It will be shown that Saskatchewan is suffering acute land hunger at present. There is simply not enough land to permit needed adjustments. But irrigation development does provide "new" land with eight to ten times the population carrying capacity of dry land and it is for this reason that

the Development can play a vital role in promoting a stable agriculture in the province, apart from its purely local stabilizing effect on the project area. Without this vital contribution little progress can be made in Saskatchewan towards modification of the effects of natural hazards inherent in our soil and climatic conditions. By this token there is no assurance that the tragic occurrences of the "Thirties" can be avoided including the huge relief expenditure of \$187,000,000 and the immeasurable destitution of the land and its people.

I wish to stress briefly at this point that, in particular, agricultural resettlement problems in Saskatchewan are more pronounced than in any other province. New land settlement opportunities in Saskatchewan are now very limited and confined largely to reclamation and irrigation possibilities. No new land areas of consequence remain available for dry land settlement. By contrast, Alberta has at least ten acres of new dry land settlement opportunities to every one acre still available in Saskatchewan, including drainage-reclamation projects. Alberta has irrigation water already allocated from interprovincial streams for 1,256,000 acres of land, while Saskatchewan, from such interprovincial streams has an allocation for only about 30,000 acres. Furthermore, Alberta has 700,000 acres of irrigable land for which water has been allocated and on which development has not, as yet, taken place.

It is quite evident that by comparison, and on the basis of need, Saskatchewan should now be favourably considered for irrigation settlement opportunities. Very little large scale irrigation development will be possible in Saskatchewan apart from the Central Saskatchewan Development and limited development based on diversions from the North Saskatchewan.

A second major contribution of the Project will be food. If Canada is expect-

ing to support a large industrialized, urban population within the next few decades it will be necessary to increase existing food supplies. Already the highly industrialized provinces are deficient in certain needed foods and this will be aggravated as industrialization proceeds. There are few remaining areas for agricultural development in Canada. The only real alternative to more intensive use of land, such as would occur under irrigation, is to look to other countries for our supplies. But the opportunity for large-scale food imports is rapidly shrinking in the world. Furthermore, it is difficult to assume reliance on imports in the face of unsettled world conditions.

A third contribution is hydro-electric power. If the Project is not constructed an annual potential of upwards of 400 million kilowatt hours will be wasted and downstream power potential will be reduced. This power is crucial to the electrification of our rural areas and to industrialization.

Saskatchewan has only two main sources of hydro power, the North and South Saskatchewan Rivers. The Development will assist immeasurably towards providing electric power to Saskatchewan people on a more equitable basis with other provinces.

Fourthly, there are important contributions in the fields of municipal water supply, flood control, recreation and industrial development stemming from the Development. While perhaps not as dramatic or as large as the agricultural, food and power benefits, they will be important contributions to urban development, standards of living, and diversification of our economy.

Over and above the foregoing contributions we must also consider the general national benefits. This, when measured in terms of additions to national income, amounts to many millions annually. These millions will be added to income in every

corner of the nation, in food processing plants, in transportation facilities, in electric appliance factories, in mines, mills and smelters and in the farm implement industry, the fertilizer industry and many others.

But what is perhaps even more important, it will result in a more stable national economy and a more united nation. The threat of an unstable wheat economy will be greatly modified by the stabilization effects of the Development and its industrial opportunities. In terms of a national development policy, which has not been evident in Saskatchewan for many decades the prospect of investment in the Development provides the federal government with an excellent opportunity to demonstrate its interest not only in redistribution of income in welfare schemes as a national policy but also in the development of resources.

The Central Saskatchewan Development represents a unique potential productive unit, composed of available soil, water and human resources, which can be utilized most effectively only through the completion of the Project. The Central Saskatchewan Development presents the most feasible and practical use of water for irrigation and power. It represents the cheapest and most efficient way to convey water to the point of development, that is, by natural channel flow. Furthermore, it is important to note that free waters in the South Saskatchewan River Drainage Basin will remain unutilized and lost unless this greatly needed project is proceeded with. It is evident that on the basis of greater need and benefits, both provincial and national, Saskatchewan is entitled to the utilization of interprovincial waters as a matter of right and in the interest of an equitable division of these great water resources between the provinces concerned. Canada cannot afford to waste these resources any longer. It cannot

permit the problem of an unstable economy to drift on the tides of natural and economic fortune. Nor can it ignore an annual loss of many millions of additional national income through failure to make an investment in the Development. The Development has been thoroughly studied and the results of these studies indicate that construction should be undertaken without delay.

The Saskatchewan Government urges the early construction of the Central Saskatchewan Development.

2. The Project and Its Potential Development

A survey of the project area will indicate clearly that it is a typical prairie problem area. It is characterized by a low and uncertain precipitation, a very low proportion of good dry land soils, generally undersized farms and a predominance of wheat production. As a result of these factors, farm incomes have been historically low and unstable, the incidence of relief payment very high, and depopulation has occurred since 1930. The entire structure of the rural community has been thereby adversely affected.

On the other hand, some of these very factors combined with others make the Area one of the most favourable for irrigation purposes. Let us examine them briefly.

With respect to soils, intensive surveys of soil conditions within the Development Area have indicated a superior irrigable area, perhaps unequalled in Western Canada. In sharp contrast to the very low proportion of soils in the Area rated as good for dry land wheat production (8.3%) over 71% of the net irrigable acreage (430,000) acres are in the two top grades for irrigation farming. Furthermore, topographical conditions are such as to permit relatively easy irrigation.

With respect to climate it has been established that the Elbow-Outlook district is one of the most arid on the Prairies and, furthermore, that effective precipitation in the Development Area is probably less than in the arid sections of Alberta. Frost free periods in the Area are approximately of the same duration as those in irrigation areas of Alberta. There is no doubt that large seasonal deficiencies of moisture prevail in the Development Area and that it would benefit greatly from ample water supplies.

It is quite clear, therefore, that this is an Area which needs water and can use it effectively. In physical terms, therefore, only the availability of irrigation water and the practicability of bringing it to the soil remain to be established. There is little doubt that these two criteria can be fulfilled.

Independent studies have indicated that sufficient water is available in the South Saskatchewan River to meet all irrigation requirements of the Development (960,000 acre feet annually). Furthermore, a report of the Prairie Provinces Water Board shows that there is enough water to produce annually 50,000,000 kilowatt hours of pumping power, 325,000,000 kilowatt hours firm commercial power, and 100,000,000 kilowatt hours secondary energy over and above satisfying all irrigation needs.

On the basis of P.F.R.A. reports which have been substantiated by recognized authorities such as Gen. H. B. Ferguson, U.S. Corps of Engineers, and Dr. A. Casagrande, Harvard University, the Saskatchewan Government is satisfied that the suggested main dam is feasible from an engineering viewpoint. This structure will create a reservoir whose capacity (8,000,000 acre feet gross and 4,000,000 acre feet live) assures virtually perfect river control.

The planned distribution system is also considered feasible. It is a compact system and thus avoids the necessity for construction of a multiplicity of reservoirs, as well as minimizing the transportation and evaporation problems encountered with lengthy canals.

Having established the agricultural and engineering feasibility of the project we might proceed now to examine its potential development. What can be done with the water stored in this immense dam and reservoir? What is the expected utilization of this virtually new resource?

(I) AGRICULTURAL DEVELOPMENT

The nature of the transformation of agricultural output on the Central Saskatchewan Development rests basically on two broad factors. The first may be described as "natural" and "engineering" and the second "economic".

On the basis of engineering and soils data, it is suggested that at least 430,000 acres of land or about 2,700 farms, in the Development Area itself (and an additional 20,070 acres in the Qu'Appelle Valley) can be irrigated with satisfactory results. Soils and climatic data just reviewed suggest that a wide range of irrigation crops can be grown successfully.

Economic factors, while of great importance, do not readily lend themselves to precise analysis. In the main, two broad economic questions are involved: the nature and extent of demand for food, and production alternatives. Demand factors, as will be shown later, indicate an overall increase in demand for food, as well as a relatively larger demand for meat, milk, vegetable and fruit products. While necessarily stated in general terms, this projection should serve as a guide to expected tendencies in food consumption in Canada. The needs of the national market can be expressed in terms of a shift from cereal

consumption to animal products and various row crops.

Given the foregoing conditions, it is then necessary to integrate them with production factors, in order to arrive at some estimate of agricultural development under irrigation. The irrigation farmer, in brief, is faced with a situation where natural factors permit him to produce a wide variety of crops and where demand conditions favour a relatively larger output of animal and vegetable products as compared to cereals. He must utilize his productive factors to yield him the highest possible net income over a period of time.

By taking all of these basic and other related factors into account it is possible to project the development of agricultural output under irrigation in the Central Saskatchewan Area.

(a) *Types of Farming*

A general assumption of a livestock-forage-cereal grain economy receives ample support from demand and production requirements. When land is first brought under irrigation on the project and during the first few years of settlement, grain will be the principal crop grown. This must be so while land is being levelled and ditches properly located. However, once this is accomplished, new irrigation farmers can start planning towards a cropping programme which will be aimed at obtaining the highest income per acre and maintaining soil fertility. Experience in other irrigated regions has shown clearly that continuous grain cropping cannot be carried on profitably under irrigation. A rotation which includes forage crops and legumes must be established if high production is to result. The typical farms envisaged in Part II of these Submissions are based primarily on livestock-forage crop and grain production with specialty crops replacing wheat production in the mature phases.

Further integration of these farms with surrounding agriculture will, undoubtedly, take place. In fact, it is essential that an optimum integration be developed as quickly as possible. Further expansion of feeder enterprises would be made possible by utilization of by-products of certain specialty crops. Specialty crop production with attendant livestock feed by-products will also develop into significant enterprises in the area. Under market conditions expected, both specialty crop production and the livestock feeding business would probably be more profitable than the beef-cereal enterprise.

(b) *Expected Changes*

With the above in mind, it is possible to visualize the changes in agriculture which will take place as a direct result of the development. These are based on initial development:

(1) On the basis of 160-acre farms the farm density in the area will be more than doubled.

(2) Total agricultural output will be at least three and probably four times the present output. This is derived from the expected increase in yields and a more intensive use of land made possible by elimination of summerfallow practices. It is expected that the area will produce for commercial disposition nearly three million bushels of wheat, more than 40 million pounds of beef, about 3,750,000 bushels of coarse grains and over 60,000 tons of hay. This output is in sharp contrast to the present relatively low average annual output in the Development Area.

(3) Grain production will be largely replaced by livestock, grass and forage crop production, together with expanding possibilities for specialty crops.

(4) Feed supplies for livestock production throughout large areas of the province will be assured. The availability of feed will permit a more intensive use of pasture areas; and the periodic deci-

mation of herds because of drought conditions will be avoided.

The Central Saskatchewan Development can thus play two major roles. Firstly, it can add greatly to agricultural stability by rehabilitating not only farmers in the project area, but also farmers from other problem areas who will be settled on new farms created; by providing assured feed supplies for livestock throughout the province; by providing a large area of permanent and stable agriculture in the heart of the province. Secondly, it will supply needed food for our citizens.

(c) Settlement and Utilization Problems

Notwithstanding the general validity of the foregoing description of expected agricultural results of the Development, the question of ways and means of assuring the actual realization of projected farm sizes, types and output must receive careful consideration. This involves problems of land tenure, education, colonization and finance. Policies must be developed in each of these aspects to insure optimum conditions for the achievement of the expected results. It is essential, in short, that the public investment contemplated be adequately protected.

Some of the common hazards of irrigation development are well known. These include lack of experience on the part of settlers; speculation in land values; overburdening of the financial capacity of settlers in early stages of settlement; and deficient utilization of land due to large holdings or excessive charges.

Lack of experience in irrigation farming can be dealt with by well planned extension and demonstration services. Experience with the Soil Conservation Service in the United States indicates that farmers can plan very satisfactorily for better land use through new farming methods with the assistance of qualified

technicians. Some of the reservations about the ability of dry land farmers to adapt to irrigation farming would not seem to be well founded in a situation where an imaginative extension programme was instituted.

Demonstration stations would also serve to overcome lack of experience of the new irrigation farmers. It is gratifying to note the excellent progress of the P.F.R.A. Pre-Development Farm at Outlook which will serve both as an experimental unit and a demonstration farm. This could be combined with the settling of experienced irrigation farmers at random through the area, thus making their experience available to the entire neighbourhood.

The other problems of irrigation farming (apart from financing the project itself) hinge largely on land policies. Speculation in land and the creation of large holdings must be dealt with by developing strong government policies. Generally speaking, there are two types of land policy which may be employed to insure financial stability and proper utilization of resources. The first would rely on private ownership of land together with comprehensive regulatory devices to control abuses. The second could be based on public purchase and long term leasing or resale provisions. It is possible to pursue either of these alternatives or a combination of the two.

The Saskatchewan Government is willing to proceed in any negotiated method of land control either by itself or in conjunction with the Federal Government which will avoid the abuses from speculation under private ownership and which will guarantee good land use, in that way protecting the public investment in irrigation development.

(II) POWER DEVELOPMENT

The impounding of South Saskatchewan waters will not only provide for

irrigation but make available a large supply of sorely needed hydro-electric power.

The Coteau Creek Dam alone will permit the annual generation of 475 million kilowatt hours of energy (325,000,000 kilowatt hours firm commercial energy, 100,000,000 kilowatt hours secondary power and 50,000,000 kilowatt hours pumping energy). In addition, the excellent river control provided by this dam will directly increase the potential of the proposed Fort a la Corne project by another 100,000,000 kilowatt hours of energy. It is highly likely that other downstream sites will benefit in the same way in the future.

The immediate additional power output which will result from completion of the Central Saskatchewan Development will, therefore, amount to 575 million kilowatt hours, assuming the probable completion of Fort a la Corne by that time. As an alternative to more expensive types of generation, this large block of energy will be integrated with other generating centres into a provincial grid which must be built up very soon to meet rising demands.

The power made available by the project will have many uses. It will be used to provide pumping power to lift irrigation water. Secondly, it will be used within the project and the area contiguous to it to supply farms and rural communities with power. Thirdly, it will be used for increasing domestic and industrial loads, and fourthly, it will be used as an important element in the overall provincial power system.

(III) MUNICIPAL WATER SUPPLIES, RECREATION, FLOOD CONTROL AND INDUSTRIAL DEVELOPMENT

These will all be important aspects stemming from the initial construction of the main dam and reservoir, as well as the irrigation project itself.

In dealing with municipal water supply it must be recognized that drought presents a serious problem to urban communities as well as to rural areas. Lack of a proper water supply can effectively limit domestic and industrial expansion, power production and living amenities.

The proposed development would be of significant financial assistance to the Buffalo Pound Lake water supply scheme for Regina, Moose Jaw and other municipalities. The present design of this project calls for pumping of water from the South Saskatchewan River to a canal leading to Buffalo Pound Lake, where it will then be filtered, treated and pumped by pipeline to the cities. Construction of a dam at Coteau Creek will eliminate this pumping. Some pumping equipment will, of course, be purchased immediately. However, additional pumping equipment required by 1980 and involving a capital expenditure of \$350,000, would be saved by completion of the dam. In addition, annual pumping costs of \$150,000 will be saved. Other municipalities in the Qu'Appelle - Assiniboine River System will also benefit from improved quantity and quality of water supplies.

Vast potential recreational facilities will be possible with the completion of the Central Saskatchewan Development. An immense main reservoir with 400 to 500 miles of shoreline will be created. Lake levels of Last Mountain Lake and of the Qu'Appelle Valley Lakes will be restored and maintained, to the lasting benefit of many resorts. These advantages will serve the double purpose of providing more accessible recreation areas for Saskatchewan residents and of attracting a larger tourist trade.

The creation of the large reservoir proposed will also have a marked effect on the flooding problem in Western Canada. The river control provided will

contribute materially² to the reclamation of lands in the Carrot River Triangle, which are now subject to annual floods.

Finally, considerable industrial development will occur as a result of the Development.

The new investment which will result from the project will cause increased expenditures for both consumer and producer goods. This will aid in attracting new industries to Saskatchewan and will encourage expansion of existing facilities. The increased purchasing power and farm investment which will result from greater production will also bring about an increased demand for goods. New processing industries, to process the added production of the area, will be established, and existing industries will be expanded. In addition, manufacturers will find many more factors favourable to the establishment of new industries.

It is essential to note that the industrial effects will be nation-wide in scope not only with respect to food industries, farm supplies industries, fuel industries and others but to the primary industries as well. The mining industry of Nova Scotia, the lumber industry of British Columbia, the packing industry of Ontario and many other industries and areas will feel the impact of the Development.

* * *

In the foregoing chapter the actual project and its potential development were outlined. The remainder of this submission will be devoted to discussing the actual impact of the Development on the provincial and national economy and largely in terms of the needs of these areas for this project and its products.

3. The Need for Further Stabilization of Saskatchewan Agriculture

An abnormal degree of instability and insecurity still prevails in the agricultural economy of Saskatchewan. This is due primarily to limited annual rainfall and

periodic drought. The high incidence of crop failure is further aggravated by price fluctuations, thus causing an instability and insecurity of income which is much more severe in Saskatchewan than in other provinces. While considerable progress has been made by federal and provincial agencies in developing conservation and reclamation programmes we have not yet realized the large scale changes which are required, thus leaving the provincial economy in a dangerously vulnerable position.

What must be done to overcome these deficiencies which are so highly injurious to the economic and social fabric of both the province and the nation? Leaving aside consideration of general national economic and social policies, several possibilities within agriculture present themselves:

(1) The economy can be diversified and stabilized by irrigation production.

(2) Individual income can be stabilized, by adjusting the size and use of production units.

In discussing the above problem and its solutions, it may be most useful to deal first with the problem of diversification and, second, with resettlement.

(I) DIVERSIFICATION OF PRODUCTION IN SASKATCHEWAN

Our Department is making great efforts towards increasing the production of livestock and livestock products. In this we are supported enthusiastically by a great many farmers who contribute to our extensive programme in Municipal Agricultural Committees and District Boards. In spite of this, our present livestock population, excluding horses, remains at about the 1921 or 1922 level. We have, now, including horses and poultry, less than one animal for every 15 acres of cultivated land.

One of the important reasons for our lack of livestock is the uncertain supply

of winter feed. Our history as a Department includes a long list of fodder problems, of buying hay and shipping it by rail at tremendous expense to keep cattle alive throughout the winter. In the prairie areas of the provinces grasses and clovers are uncertain low yield crops—without water. Only in better than average years will they produce as much as a ton per acre. Efforts to obtain stands result in a percentage of failures depending on the area and the weather following seedling. As a result most of the cattle in the prairie areas are wintered on slough hay or on straw. Winters may start in October or late December and end in March or mid-May.

Farmers throughout the prairie parts of Saskatchewan know only too well what a crop failure means when livestock are kept. Our worst experience was in 1937. Between September 1, 1937, and August 31, 1938, more than 450,000 tons of fodder were shipped by governmental agencies—this even after a liquidation of 611,574 cattle for canning purposes at 1-1½c per lb. had occurred. In that year alone more than \$3,500,000 was spent in freight moving hay, feed grain and seed.

We hope that this will not happen again—but in each of the years 1945, 1947, 1948 and 1949 it was necessary to ship hay into Saskatchewan to supply areas that had suffered a failure of hay crops. During that period hay has moved from The Pas, Manitoba, to Prince Albert and Saskatoon, from Brooks, Alberta, to Moose Jaw and Swift Current, even from the Inter-Lake country of Manitoba as far as Saskatoon, with freight charges as far back as 1948 running to \$10 per ton.

Perhaps it is little wonder that many farmers, in this area, even though they would like to do differently, refuse to accept the risk of keeping livestock. That they have done so is illustrated by a cattle population in Census Division 11,

which contains a large part of the project, of 54,000 cattle as compared to populations of 75,000 and 90,000 cattle in Census Divisions 9 and 10 respectively.

The Saskatchewan Government has viewed this matter of recurring fodder shortages as one of our major production problems. We have established a Conservation and Development Branch to bring into production every acre of irrigable land as quickly as possible. We have undertaken very sizable expenditures to reclaim clay land for fodder production, accepting the fact that yields are low and uncertain. We have undertaken to accumulate fodder reserves in the hands of the Department even though we recognize that it is extremely expensive and that such reserves can, at best, be totally inadequate to meet a real emergency. We share the cost equally with any municipality or groups that wish to develop an area to grow winter feed. Accepting the fact that fodder production in much of the prairie area is hazardous we have undertaken an all out extension programme and have offered assistance in the sale of forage seed to encourage farmers to try to grow more fodder.

Nevertheless, we are today probably even more vulnerable to crop failure and fodder shortages than in 1937. Fifteen years ago we had sizable reserves in the form of straw piles which are now a thing of the past. It is no exaggeration to say that another year such as 1937 would deal our livestock industry and the whole concept of conservation through livestock production a crippling blow which might be effective for decades.

In 1949 a total crop failure (less than three bushels per acre) occurred in about 63 municipalities and L.I.D.'s. A most serious situation was averted only through an intensive campaign, a good hay crop in south-eastern Saskatchewan and south-western Manitoba, the movement of more than 30,000 tons of hay with government

assistance, and a reduction in size of many herds in the area. The use of a few thousand tons of hay in our reserves forestalled a major disaster in the late spring of 1948, following a poor hay crop over about one-half of the province. Many farmers within a few miles of the irrigable area of this project carried their cattle through with seed wheat and the old straw roofs of sheds.

* * *

It is apparent, therefore, that little progress can be made towards diversification without considerably more protection against feed deficiencies. The Central Saskatchewan Development provides us with an opportunity to establish sure crop areas, a high yielding area within only a few miles of some 25 municipalities in the heart of a very dry region and within almost 150 miles of our whole crop failure area. This area would provide assured production of fodder, of feed grain and of seed grain. It is completely surrounded by an area of farming land in which production is anything but certain.

(II) ADJUSTMENT OF FARM SIZES— RESETTLEMENT

In the light of production experience and various other factors it has been evident for some decades that the original pattern of settlement in Saskatchewan has resulted in a problem of undersized farm units. Over large areas our farmers have found that they have insufficient land to combine with modern, efficient machinery in order to produce a satisfactory farm income. To counteract this serious condition, slow and painful adjustments have taken place over the years. Since 1911, for instance, improved acreage per farm in Saskatchewan has almost tripled (Table 1).

Table 1—Changes in Farm Sizes, Saskatchewan, 1911-1951

Year	Occupied Acreage/ Farm	Improved Acreage/ Farm
1911	295.7	125.0
1916	353.8	188.7
1921	368.1	209.6
1926	390.1	235.3
1931	407.9	245.8
1936	399.6	236.2
1941	452.3	256.5
1946	472.5	283.7
1951	550.4	346.4

Source: *Census of Canada*, 1911 to 1951, inclusive.

That this process has been accompanied by great cost in both economic and social terms is evidenced by the huge relief and similar expenditures from 1907 to 1951 (Table 2).

Table 2—Financial Assistance to Saskatchewan Farmers, 1907-08—1950

Debt adjustment and tax cancellation	\$125,000,000
Relief*	186,500,000
Federal Programmes**	153,600,000
Total	\$465,100,000

*—Including relief advances for agricultural assistance and direct relief, 1907-08 to 1950-51. Most of this sum was actually paid out in the decade 1929 to 1939.

**—Including P.F.A.A., P.F.I., and W.A.R. payments, 1939-1950 inclusive.

Source: Statistics Branch, Saskatchewan Department of Agriculture. D.B.S., *Handbook of Agricultural Statistics*, Part II, February, 1952.

Nevertheless, uneconomic farm units still persist in large numbers and present a continuing threat to our economy. Our Department of Agriculture in attacking this problem has stated:

"The average minimum size of farm required for an economic unit in Saskatchewan, even on some of the better soils, is three-quarters of a section. In 1941, two-thirds of Saskatchewan farmers had less land than this minimum. At least one-quarter of these have an urgent need for additional land, to the point where they have an actual problem of resettlement. In other words, there are approximately 20,000 Saskatchewan farmers with an urgent resettlement problem and an additional 40,000 who require additional land to make their present units economic and secure."¹

¹ Province of Saskatchewan, Department of Agriculture, *The Allocation of Northern Lands*, 1952, p. 2.

I would like to stress here that the problem of lack of sufficient farm acreage is not confined solely to the south-western or central portion of the province but is also a feature of the pioneer areas in the north where similar settlement errors have been committed: Settlers were moved from the drought areas to those regions only to find themselves faced with years of backbreaking struggle to carve out workable acreages. Their needs for land must receive a high priority.

Although it is difficult to state categorically the desirable size of farms in the various areas of the province, it can safely be assumed that as a bare minimum alternative employment must be found for operators of 10,000 units throughout the province. The need for alternative employment might be avoided by technological, physical or economic changes which would result in a greater population carrying capacity in presently depressed areas. But the scope for such changes is severely limited. More drought resistant crops, higher wheat prices and lower costs of input factors are all rather distant possibilities. A redistribution of land holdings in some very limited areas where excessive land concentration has taken place must also be regarded as similarly remote. Probably some progress could be made by making satisfactory credit available in certain areas but, in the main, the use of this credit would involve purchase of additional land and consequent displacement of some farmers. By and large, therefore, the solution is one of economically resettling a considerable number of Saskatchewan farmers. Such resettlement will permit the absorption of vacated farms, as a means of increasing farm sizes in deficient areas. It is necessary, then, to consider what avenues are available in Saskatchewan to provide for such a resettlement programme.

(a) *Irrigation*

The only known irrigation resettlement possibilities of any consequence in Saskatchewan are those of the Central Saskatchewan Development. It is quite apparent that, apart from the South Saskatchewan River, practically all of the streams have already been allocated to existing projects or projects which are in some stage of completion. In fact, shortages in some of the watersheds are preventing complete utilization of some projects. It will be pertinent to review these briefly.

(1) *Small Projects*—In the main, small projects¹ do not permit the establishment of new or additional settlement units. These small projects are limited in their usefulness to stabilizing existing dry land units.

(2) *Organized Projects*—These range in size from several hundred up to 20,000 acres and are largely located in south-western Saskatchewan. Because of water shortages and soil restrictions, it is expected that a maximum of 120,000 acres will comprise the organized project category. A considerable portion of this acreage has already been developed and settled.

(3) *Special Projects*—This category includes major developments in Alberta and Saskatchewan such as the Red Deer Project, the Canada Land Project, St. Mary's Project and the Central Saskatchewan Development. The development of these relatively large projects in Western Canada offers excellent opportunity for resettlement of what are now relatively unproductive farms and will also permit stabilization of farmers within project areas. Use of the projects for resettlement purposes will permit desirable enlargement or change in land use by the use of vacated dry land farms.

¹ Including dugouts, stock watering dams and individual projects.

The total land area contained in these projects is in the neighbourhood of some 1.4 million acres which would contain approximately 9,000 farms (assuming irrigation farms to be 160 acres in size). However, some allowance must be made for dry land farmers existing now on these irrigation areas and it is quite probable, making this deduction, that only about 5,000 units will be available. Of these available units it is doubtful whether more than 50 per cent. or 2,500 farms will be made available to Saskatchewan farmers. In fact, the figure of 50 per cent. appears unduly optimistic since the Provincial Government of Alberta will control the St. Mary's and the Red Deer Projects and may not be in a position to offer irrigation farms to Saskatchewan farmers when the needs of Alberta farmers have to be met.

(b) *Northern Settlement*

Various estimates have been made regarding the amount of land susceptible to settlement in the northern areas of Saskatchewan. These estimates must be modified for purposes of planning resettlement since a portion of the land must be made available to undersized units within the pioneer regions. C. C. Spence makes this adjustment in his estimate,¹ and estimates that 3,000 units are available for resettlement.

While this may seem unduly conservative, it is even more liberal than the estimates of the Provincial Department of Agriculture which states that a maximum of 2,400 new units can be made available in the north.

* * *

From this brief survey of settlement possibilities it is clear that every feasible project must be fully exploited, in order to alleviate the pressure for readjustment

of uneconomic farm units in Saskatchewan. Complete development of all foreseeable irrigation or northern settlement schemes can, at best, provide for 5,500 additional units whereas the actual requirement is in the neighbourhood of 10,000 new farms or its equivalent acreage.

The Central Saskatchewan Development presents an excellent opportunity for rehabilitation of depressed and insecure farmers. Furthermore, the vacating of farms in certain arid areas of the province will permit enlargement and stabilization of remaining farms.

(III) SUMMARY

I have attempted to touch on two of the major needs of agriculture in Saskatchewan (apart from market and price considerations). There is a great need firstly for assured feed supplies to permit increased diversification of the economy through livestock production and, secondly, for new land on which to resettle insecure farmers. Neither of these needs can be adequately filled without the Central Saskatchewan Development. Construction of this project will be a great step forward towards meeting the need for a mature and stable agricultural economy in Saskatchewan. How can we merely calculate in terms of dollars and cents what it might be worth to us? Is it any wonder that the Government of this province is anxious and ready to make its investment in the project—that we are so eager to see it started?

4. The Need for Hydro-Electric Power in Saskatchewan

The lack of abundant low cost electric power has limited the economic development of Saskatchewan. Saskatchewan's relatively inferior position is illustrated by the following table which shows that this province ranked eighth in annual per capita electric power consumption in 1951.

¹ C. C. Spence, Land Settlement in Western Canada, "*Economic Annalist*," May, 1946, p. 40.

Table 3—Total & Per Capita Electric Power Consumption in Canada, 1951

	Total	Population June 1, 1951	Per Capita Consumption	Rank
	000 Kw. Hrs.			
Canada.....	55,031,924	13,984,329	3,935	....
Newfoundland.....	125,607	361,416	347	9
Prince Edward Island.....	23,399	98,429	237	10
Nova Scotia.....	875,380	642,584	1,362	6
New Brunswick.....	716,915	515,697	1,390	5
Quebec.....	24,124,977	4,055,681	5,948	1
Ontario.....	20,571,220	4,597,542	4,474	2
Manitoba.....	2,928,912	776,541	3,772	3
SASKATCHEWAN.....	457,465	831,728	550	8
Alberta.....	1,021,073	939,501	1,087	7
British Columbia.....	4,186,972	1,165,210	3,593	4

SOURCE: D.B.S., *Central Electric Stations*, December, 1951. Department of Resources and Development, *Water Power Resources of Canada*, March, 1952.

The deficiency in electric power is evident throughout the provincial economy. In urban centres the rate of industrialization has been retarded, and in many communities the numerous amenities made possible by availability of abundant electric power are still lacking. In rural areas, and particularly on farms, lack of this and other facilities has had a profound effect on the very structure of rural life. Steps are being taken to correct the situation but potential demand is many times greater than available generating capacity.

The following estimates of present and potential loads on the provincial power system have been made:

Year	Load (million kwh)
1949	346
1954	635
1959	1,172
1964	1,764
1969	2,411

Almost eight times the present power will be required by 1970 to meet expected demands. The large block of energy which will be made available by construction of a dam on the South Saskatchewan River near Coteau Creek could, therefore, play a vital role in the future progress of Saskatchewan.

In relating the province's obvious need for economical and abundant electric

power to the Central Saskatchewan Development, data on consumption of electric energy in the area adjacent to the Development have been compiled and projected to 1968.

The loads include all consumers in the North Battleford-Saskatoon-Prince Albert system, the Unity-Kindersley system, the Swift Current-Moose Jaw system, and the Cities of Moose Jaw and Regina, together with associated rural loads. The compilation was based on 1949 consumption and has been extended for urban centres, as well as the rural electrification programme, which by 1969 will include approximately 75,000 farms. It may be noted that the actual consumption for 1950 and 1951 in the Saskatchewan Power Corporation system (which does not serve the Cities of Moose Jaw and Regina) lies on the projected curve.

The consumption for this adjacent area in 1964 is estimated to be approximately 1,100,000,000 kilowatt hours. This is bulk energy delivered to the distribution system in the case of cities, and to consumer meters in towns, villages, hamlets and rural areas. The addition of system losses increases the required generation by some 20% or to 1,350,000,000 kilowatt hours annually.

If the completion date for the Central Saskatchewan Development is assumed to be not earlier than 1964 the required generation in the contiguous area will be approximately 1,350,000,000 kilowatt hours or four times the estimate of 325,000,000 kilowatt hours of firm output for the project. The Moose Jaw-Regina area alone could absorb the available output.

5. The Need for Increased Food Output in Canada

A major economic and social contribution flowing from the proposed development of the Central Saskatchewan Development will be the significant increase in the production of food and foodstuffs made possible by bringing the lands under irrigation. Output on the 430,000 acres contained within the project area will be increased three or even four-fold. Saskatchewan, however, is already well established as an important surplus producer of certain basic foodstuffs. Hence the potential expansion in output might be regarded as of doubtful economic significance, were it not for the fact that present and future requirements for food at provincial, national and even international levels are likely to absorb the whole of the anticipated increased production. Existing trends suggest more strongly that the continued rising demand for foodstuffs, and particularly for animal products, will provide economic and accessible markets for the full output of the developed project.

The demand for food is based primarily on two major factors—population and income. The former will indicate total expected consumption determined most realistically by existing patterns of consumption. The latter is closely related to the qualitative aspects of consumption, that is, the kinds of food people eat. In addition to these basic factors are such other influences as international policies, national trade policy, industrialization and

urbanization, age distribution, nutritive standards, and so forth. It is not proposed to examine all these ramifications, but rather to consider markets in Canada chiefly from the point of view of future population.

(I) THE FUTURE CANADIAN FOOD MARKET

Beyond the boundaries of Saskatchewan itself lies a rapidly-growing and accessible market for all manner of foodstuffs. In terms of demands resulting from increased population, the Dominion Bureau of Statistics has projected forecasts of future population size based on data up to the 1941 census.¹ The Bureau's most realistic estimate suggested a Canadian population of approximately thirteen millions by 1951 and fifteen and half millions by 2001. It is quite obvious from the 1951 census that a significant error in growth rates had been made since the total Canadian population in 1951 was over fourteen millions. It would seem that the entire trend should be revised, on the basis of a higher fertility rate, to forecast a considerably larger population by 1970 or 2000.

It is of interest to note that similar and even more serious errors in population forecasting were experienced in the United States. These are reported in an article by Professor Joseph S. Davis of Stanford University, dealing with future demands for food.²

"Ten months ago the standing official forecast for 1970 was, in round figures, 160 million, and this was the figure commonly used by economists. Six months ago, the revised official forecast indicated that this figure would be reached in 1960. Evidence now available strongly suggests that our true population will reach 160 million during 1955, if not earlier."

Professor Davis relates this unexpected population increase to food needs and

¹ Dominion Bureau of Statistics, *The Future Population of Canada*, Bulletin F-4, 1949.

² Joseph S. Davis, "Our Amazing Population Upsurge", *Journal of Farm Economics*, November, 1949.

asserts that projected food demands should be revised upwards. He declares:

"In conjunction with our higher consumption standards, I believe that our demand for milk, meat and other animal products will become such as to put pressure upon our ability to expand the output of these products."

On the basis of developments in Canada and the United States, it would appear reasonable to expect a Canadian population approaching 20 million between 1975 and 2000.

This projection is by no means liberal in view of the statement of Mr. St. Laurent in the House of Commons, recently (Hansard, June 28, 1952, p. 3946). The Prime Minister stated at that time:

"This means that at the end of the century there will be no less than 35 million people for whom the country will have to provide agricultural sustenance."

What does this mean in terms of actual food and acreage requirements? An estimate has been prepared based on the assumption that current levels of per capita consumption of various foods will be maintained and that relative levels of imports and exports will remain constant. The details are contained in Appendix I and only a few figures are quoted here. The following table lists estimated additional acreage requirements to feed a Canadian population of twenty millions.

Table 4—Additional Acreage Requirements to Feed a Canadian Population of Twenty Millions

	Additional Acreage Requirement ('000 Acres)
Food	
Butter	2,260
Beef and veal	3,655
Pork	1,500
Fluid Milk	2,377
Sugar Beets	30
Dry beans and peas	60
Total	<u>9,882</u>

It is quite obvious from this list that either new agricultural land will be needed or more intensive use of present acreage instituted if we are to feed a population of 20 millions without major reliance on imports for many of our foods.

The former possibility does not appear to offer significant opportunities. The era of expanding agricultural acreage experienced on this continent from 1900 to 1930 is now over. Only small areas still await development. Mechanization has already freed large acreages for production of food, but no comparable physical or technological frontier can be foreseen. Canada will thus have to rely on more intensive use of soil resources in the future in order to meet growing requirements for food.

(II) SUMMARY

In summary, anticipated population changes in the next twenty-five or thirty years strongly suggest much larger food requirements on the part of the Canadian people. This rising demand can only be met by a significant expansion in total food production and a relatively larger output of meat, milk, vegetables and fruit products, if exports and imports of these particular foodstuffs are to be maintained at present levels.

There is, moreover, a considerable weight of evidence to suggest that the demand for exports of food from Canada is likely to increase at a rate comparable to that within the country. Growing populations and limited soil resources have made self-evident the basic necessity for increasing total world food output. It is not proposed here to attempt to appraise the economic effectiveness of rising world food demands, since it is contended that the entire increased output of the Central Saskatchewan Development will be absorbed by domestic food requirements. At the same time, the vastly greater needs of the world at large give still greater importance to the potential returns from this major irrigation project.

6. National Benefits

Up to this point in the Submission the need for the Central Saskatchewan Development, together with its potential contribution, in terms of increased agri-

cultural stability and security, food supply, hydro-electric power, recreational facilities, municipal water supply, flood control and industrial development, have been discussed. It remains to associate this development with the national economy. I propose to do this in two ways. Firstly, the actual contributions to national output will be measured and, secondly, the place of this investment in a national policy will be discussed.

(I) INCREASES IN NATIONAL OUTPUT
RELATED TO THE CENTRAL SASKATCHEWAN DEVELOPMENT

In the Interim Statement by the Saskatchewan Government to the Commission "benefits" were estimated on a basis of direct returns to the irrigation farmer or to power. While this measure is a useful one, in terms of planning individual farm organization and determining repayment ability of irrigation farmers, or in planning power organization and determining its repayment ability, it does not indicate the total impact of increased production on national income. To do

this, as is done in measuring national output it is necessary to follow each product through its marketing and processing stages where value is added throughout, arriving finally at the value of the product at the final consumption level. This technique has been applied here. Certain assumptions have been made in order to justify its use and these are contained in Appendix II.

(a) *Increases Related to Agricultural Production*

In general, additions to national output are measured here by adding the margin between farm and consumer to the farm price. This has been done for six products, wheat, oats, barley, hay, cattle and sugar beets. A composite output for the project as a whole is derived from the average production figures indicated in the alternative types of farm organization presented in Part II.

The following table summarizes the expected contributions to national output from the Central Saskatchewan Development.

Table 5—Gross Annual Agricultural Contributions of the Development to National Output

Product	Value	
	Initial Development	Mature Development
	\$	\$
Wheat.....	5,370,000	4,350,000
Barley.....	1,434,375	1,636,875
Oats.....	679,000	742,500
Hay.....	1,188,000	2,160,000
Cattle.....	32,400,000	32,400,000
Sugar Beets.....	.....	16,174,080
	41,071,375	57,463,455

This, of course, is a gross contribution since the existing farms in the area are at present producing income. It is necessary to estimate the value of this production under assumptions used above.

Table 6—Present Annual Agricultural Contribution of the Project Area to National Output

Product	Value \$
Wheat	3,580,000
Barley	403,200
Oats	696,018
Livestock	2,241,000
	<u>6,920,218</u>

The net contribution of the project in terms of agricultural products is obtained by taking the difference between the values under irrigation and under present dry land practices. At initial development the net contribution is \$34,151,157 annually; at mature development the net contribution is \$50,543,237 annually.

There are, in addition, other contributions stemming from intensified agricultural production in the area. Not only will increased production of agricultural products from the Development increase national output but increased demand of irrigation farmers for goods and services will also have a considerable effect. Each new farmer will spend about \$4,500 annually for goods and services (see Part II). For the 1,455 new farms this totals approximately \$6,500,000 added to national output annually. In addition, the existing farm population will increase its expenditure because of more intensive production. In all, about \$10,000,000 will be added annually to national output.

* * *

Thus, it may be anticipated that agricultural development on the project will result in the addition of from \$44 to \$67.5 millions annually to national output. That this contribution will be widespread is implicit in the above estimate. Food pro-

cessing, transportation, implement, fertilizer, and marketing establishments and many others will all feel the impact of these dollars. Tax collections at all levels of government will increase as a direct consequence.

(b) Increases Related to Power Production

This contribution is measured by applying retail prices of power to the expected output from the Coteau Dam. The annual report of the Saskatchewan Power Corporation indicates that the value of power sold in 1951 was approximately three cents per kilowatt hour. Since the output of firm power from the Coteau Creek installation is expected to be 325 million kilowatt hours annually, this output, at present prices, is worth almost \$10 million. This estimate could be extended to include other hydro-electric power made available as a result of the Coteau Dam.

Availability of power will, at the same time, stimulate a great demand for electrical appliances of various kinds and, undoubtedly, the annual investment in these items will be far greater than the annual value of power. It is estimated, for instance, that investment in domestic appliances on an electrified farm approximates \$1,500 today. Added to this is the value of numerous pieces of electrical equipment used in farm production. It is apparent, therefore, that the provision of power will have far-reaching effects on the national economy.

(c) Summary

It may be expected that production of food and power and increased demand for goods and services arising from the Development will add from \$54 to \$77.5 millions to national output annually. This estimate cannot be considered extravagant in view of a number of related

contributions which were not evaluated. It is of cardinal importance to note the national impact of this investment. One could note the industries, areas, and people affected for many pages—without exhausting the list. It is also of importance to note that if the total investment of \$100 millions is spread over the lifetime of the project it is a very small fraction of the anticipated annual contributions to national output. Two essential criteria are thus satisfied. Firstly, the national impact of this investment in Saskatchewan is marked and widespread. Secondly, the investment is a paying proposition.

Can Canada afford to incur the substantial losses to her economy implied in failure to proceed with the project?

(II) THE CENTRAL SASKATCHEWAN DEVELOPMENT AND NATIONAL POLICY

Having definitely established the feasibility of the Development in engineering and agronomic terms, in terms of provincial and national economic value, in terms of provincial agricultural stability and economic security and in general provincial social terms, there remains the question of the relationship of this project to national policy.

What should this relationship be? It is submitted here that national benefits mean not only dollar returns to the nation from a national investment but social and political returns in terms of national policy and national interest. It is insufficient to argue that national interest in the redistribution of income or in the creation of equal opportunities lies wholly within the field of welfare programmes. Equal opportunity in resource development must become a principle of equal force. It is within the context of this principle that we argue for construction of the Central Saskatchewan Development.

It is submitted here that Saskatchewan has been largely by-passed in federal resource development programmes since the early days of its settlement despite its wealth of undeveloped resources and actual known projects awaiting development. Reference might be made here to federal investment in the various provinces. This neglect has not escaped public notice. In fact, it might be well to quote the thoughts of Mr. St. Laurent:

"The third project was the South Saskatchewan River Project. This is of particular interest to the central provinces, but it is also of interest to the whole of Canada to have Canada developed in such a manner that there will be no depressed areas in this country.

These three projects (St. Lawrence Seaway, Canso Causeway and South Saskatchewan River Project) appear to fill out the picture, because we know what huge developments are taking place in British Columbia; we know what huge developments are taking place in Alberta; we know what developments are in prospect in northern Manitoba for the promotion of which authority was given at the last session of parliament to the Canadian National Railways to construct a line of railway. I think all members of this house realize that these projects, though located in particular areas, are of national importance if they are sound and if we can get evidence reasonable men will accept that they constitute a proper investment of the capital of this country." (Hansard, June 28, 1952, p. 3945).

Construction of the Central Saskatchewan Development will serve to strengthen and unify our nation. Certain investments of this nature have been made in Saskatchewan in the past and have made valuable contributions to the province and nation but much more must be done if Saskatchewan is to be considered a full partner in a national development policy. Support for the project as a national responsibility is in evidence throughout Canada. No other single project in recent Canadian history has received such consistent and unqualified public support from both western and eastern Canada.

The Federal Government recognizing the national merits of the scheme has already made its commitment. In the

same address noted above Mr. St. Laurent stated:

"I hope this Commission will find that the South Saskatchewan project would constitute a proper investment of the amount of capital required to bring it into existence. If it does there will be a commitment by this government, and I am sure there would be a commitment by any government in office, to carry out the project provided there are satisfactory reports. . ."

* * *

In conclusion, I wish to stress that Saskatchewan has only two rivers as a source of extensive irrigation and power development, the most important being the South Saskatchewan. The people of Saskatchewan have looked hopefully for many years towards the construction of the Central Saskatchewan Development. We trust that this hope will not be turned to despair. Construction of this great project will provide a tremendous boost to the morale of Saskatchewan people. The people of this province have contributed greatly to the national wealth of Canada and have an undeniable right

to an equitable share in the development of our great water resources. They have also experienced great hardship and despair because of the natural and economic handicaps imposed upon them. They have a legitimate right to expect that our national government will recognize these facts and proceed with this long awaited development.

The people of this province are weary of being relegated an inferior position and subjected to criticism for being subsidized by relief measures necessitated by conditions beyond their control. You may be assured that this province will be forever grateful for the benefits made possible by the construction of this project. You may also be assured that nothing else will do more towards renewing confidence in confederation and nationhood on the part of the people of Saskatchewan.

The Government of Saskatchewan urges the Commission to recommend immediate construction of the Central Saskatchewan Development.

Appendix I

ESTIMATE OF FOOD AND ACREAGE REQUIREMENTS OF A CANADIAN POPULATION OF TWENTY MILLIONS

The estimated food requirements of a Canadian population of twenty millions are contained in Table 1, together with an estimated deficit based on present production. It is assumed here:

(1) that the food consumption pattern

will be maintained. (This probably biases the estimate in favour of "non-protective foods");

(2) that import levels will not change;

(3) that 1949-50 production levels of the various foods are typical.

Table 1—Estimated Supply and Requirements of Food in Canada

Food Groups	Available from Domestic Production, 1949	Per Capita Con- sump- tion 1949	Indicated Total Food Re- quirements Basis 1949 Consump- tion and 13,549,000 Population	Indicated Total Food Re- quirements Basis 20,000,000 Population	Surplus (+) or Deficit (-) of Supplies Over Domestic Consumption 20,000,000 Population
		lbs.	000,000 lbs.	000,000 lbs.	000,000 lbs.
1. FLOUR & CEREALS	15,738 million lbs. (in terms of flour)	167.7	2,260	3,354	+ 12,384
2. POTATOES.....	5,352 million lbs.	211.5	2,866	4,230	+ 1,122
3. DRY BEANS & PEAS ...	212 million lbs.	13.6	184	272	- 60
4. FRUIT (citrus & tomatoes, etc. fresh, canned, and frozen).....	1,146 million lbs.	177.4	2,404	3,548	- 2,402
5. VEGETABLES (fresh, canned and frozen).....	1,560 million lbs.	80.5	1,091	1,610	- 50
6. OILS & FATS					
(a) Lard.....	110 million lbs.	8.1	123	182	- 72
(b) Butter.....	320 million lbs.	23.5	326	470	- 150
7. MEAT					
(a) Beef.....	867 million lbs.	56.5	766	1,130	- 263
(b) Veal.....	124 million lbs.	9.1	123	182	- 58
(c) Mutton & Lamb	44 million lbs.	3.0	41	60	- 16
(d) Pork.....	911 million lbs.	59.2	803	1,184	- 273
(e) Canned Meats and Edible Offals.....	132 million lbs.	9.4	127	188	- 54
8. POULTRY.....	292 million lbs.	21.2	287	424	- 132
9. EGGS.....	334 million doz. or 459 million lbs.	33.5	453	670	- 211
10. MILK (or its equivalent)	6,476 million lbs.	474.7	6,476	9,494	- 3,018
11. SUGAR & SYRUPS					
(a) Sugar Beets.....	291 million lbs. of sugar equivalent when manufactured	15.4	208	308	- 100
(b) Honey.....	31 million lbs.	2.4	32	48	- 14
(c) Maple Sugar & Syrup.....	23 million lbs.	1.0	13	20	- 3

Having estimated food deficiencies it is now necessary to translate these into acreage requirements.

ADDITIONAL ACREAGE REQUIRED TO MEET FOOD REQUIREMENTS ASSUMING A POPULATION OF 20 MILLIONS IN CANADA

1. FLOUR AND CEREALS—No additional acreage requirements.

2. POTATOES—No additional acreage requirements.

3. DRY BEANS AND PEAS—The long time average yield per acre of peas and beans in Canada is 17 bushels to the acre. This would indicate that an increase of some 60,000 acres would be required.

4. FRUIT—Fruit acreages for Canadian crops are not available. However, judging by the huge deficit in supplies over domestic requirements at 20 million population, it might be concluded that the acreage required would approximate three times the present acreage devoted to fruit crop production in Canada.

5. VEGETABLES—The average yield per acre of vegetables in 1950 was 12,470 pounds. Applying this figure to the deficit of 50 million pounds on the assumption of the increase in population, it is estimated that an additional 4,000 acres would be required.

6. OILS AND FATS—The butter deficit indicated is 150 million pounds or converted to pounds of milk some 3,500 million pounds of milk equivalent. With an average production of 5,000 pounds of milk per cow, some 700,000 additional dairy cows would be required. To feed these additional cows would require at average yields, about 1,750,000 acres of pasture, about 260,000 acres of grain, 75,000 acres of corn for silage and 175,000 acres of hay.

This added production of butter would still only compensate for half of the incipient deficiency in the supply of oils and fats in Canada on the assumption of a 20 million population.

7. MEAT—

(a) *Beef and Veal Requirements*—The increase in the production of beef

to provide the additional quantities required to feed a population of 20,000,000 would be about 265,000,000 pounds of beef and 60,000,000 pounds of veal. During 1951 the average carcass weight of inspected slaughtered beef was 507 pounds and that of veal was 122 pounds. This would mean that to produce this additional quantity of beef and veal would require an additional 520,000 head of cattle and 475,000 calves, or a total of 975,000 cattle and calves. To feed these additional cattle and calves would require at average yields and in round figures about 2,440,000 acres of pasture, 730,000 acres of grain and 485,000 acres of hay.

(b) *Pork Requirements*—The deficit in pork supplies over requirements were the population to increase to the 20 million level would be approximately 275,000,000 pounds. With an average dressed weight of 163 pounds per hog, required additional increase would be equivalent to an increased production of 1,680,000 hogs.

Assuming a production of 1,200 pounds of grain per acre sufficient to feed 1.12 live hogs the total grain acreage required to feed 1,680,000 hogs would be approximately 1,500,000 acres.

No allowance has been made for the additional acreage requirements to meet the deficiencies in the production of canned meats and mutton and lamb.

8. POULTRY—The increase in acreage required for poultry is quite difficult to estimate. The deficiency in anticipated supplies over requirements is roughly 45% of 1950 production.

9. EGGS—Egg production would be required to increase by almost 50 per cent. to make up anticipated deficiencies at the assumed population level of 20 million.

10. MILK—The increase in the production of milk to provide the additional quantities of fluid milk or its equivalent required to offset the requirements of a population increase would be more than 3,000,000,000 pounds annually. With an average production of 5,000 pounds per cow, some 600,000 additional dairy cows would be required. The feed for these additional cows would require, at average yields, about 1,500,000 acres of pasture, about 450,000 acres of grain, 127,000 acres of corn for silage and 300,000 acres of hay.

11. SUGAR BEETS—It would be necessary to increase present sugar beet pro-

duction in order to make up an anticipated deficiency in sugar production over requirements of 100,000,000 pounds or 590,000,000 pounds of sugar beets. The long time average yield per acre of sugar beets in Canada is some 19,200 pounds. Thus, the required additional acreage of sugar beets would be approximately 30,000 acres.

Note: The estimates on additional acreage requirements for beef, pork, milk, and butter deficiencies are projected from calculations made by W. C. Hopper, "Food Consumption in Post-War Canada," *C.S.T.A. Review*, March, 1945 (Canadian Society of Technical Agriculturists, Inc.), Ottawa, pp. 26-35.

Table 2—Summary of Additional Food and Acreage Requirements

Food	Additional Requirements	Acreage Requirements
	million lbs.	thousand acres
Dry beans and peas.....	60	60
Fruit.....	2,402	no estimate
Vegetables.....	50	4
Lard.....	72	no estimate
Butter.....	150	2,260
Beef and veal.....	321	3,655
Mutton and lamb.....	16	no estimate
Pork.....	273	1,500
Canned meats and edible offals.....	54	no estimate
Poultry meats.....	132	no estimate
Eggs.....	211	no estimate
Milk.....	3,018	2,377
Sugar Beets.....	100	30
Honey.....	14	no estimate
Maple sugar and syrup.....	3	no estimate
Total.....		9,886

Appendix II

ASSUMPTIONS UNDERLYING THE CALCULATION OF INCREASES IN NATIONAL OUTPUT STEMMING FROM AGRICULTURAL PRODUCTION OF THE CENTRAL SASKATCHEWAN DEVELOPMENT

In the Interim Statement "agricultural benefits" were estimated on a basis of direct returns to the irrigation farmer. While this measure is a useful one it does not indicate the total impact of the increased agricultural production of the

project on national income. To do this it is necessary to follow each product through its marketing and processing stages where value is added throughout, arriving finally at the value of the consumption level which represents a component of national output.

In order to apply this technique it is necessary to make certain assumptions. First, it must be assumed that sufficient effective demand for the products exists. This is established in the submission. Secondly, it must be assumed that sufficient capacity exists in the economy so that the new production from the project generated by demand and supply conditions is not merely "substituting" for other types of production. For instance, in a completely and strictly fully-employed economy additions to national income would not be possible since it would be necessary to transfer already fully-employed resources if additional production were to be introduced. It will be demonstrated, however, that this condition does not obtain and, in fact, processing and marketing facilities in existence at present have considerable excess capacity (see Addendum). Furthermore, expected population increase will form the basis, not only for a demand for food but also an adequate labour supply. The general assumption adopted here is that the increased production that is over and above present primary and secondary production can be assumed an addition to national income.

Thirdly, it is necessary to assume that the production, marketing and processing of foods is the best way to utilize the resources involved and in any case that net addition to national output is the difference between the suggested and the *next best* use of the resource. If it is

assumed that effective demand for food will exist, then the only alternative to increasing Canadian food production is to import food. Taken by itself, this alternative does not appear promising since the type of foods which the Development will produce is not available in the world market at reasonable price levels. Furthermore, there appears to be some necessity for assured national food production in the world today. Despite these general arguments it is still necessary to establish some differential between the alternatives in resource use, simply because there are real alternatives available at certain price levels. Unfortunately, the means for doing this are not available and any arbitrary application cannot be justified. A differential can actually be established in the primary phase of production, that is, the difference in output between present dry land and future irrigation output of the resources involved. The same kind of differential is applied in secondary production with the assumption that the resources employed today will be operating more efficiently on the basis of increased volume.

With these basic assumptions in mind, it is possible to proceed with the task of estimating the additions to national output generated on the one hand by demand requirements and on the other by production resulting from the Development. This is done in Part II of these submissions.

Addendum

CAPACITY OF FLOUR MILLING AND MEAT PACKING INDUSTRIES IN CANADA

(a) THE FLOUR MILLING INDUSTRY

In the *Report on the Grain Trade of Canada, 1948-49*, a joint publication of the Dominion Bureau of Statistics and the Board of Grain Commissioners, it is stated that in 1949 the percentage of milling capacity utilized by the flour milling industry of Canada averaged only 67.3 per cent.

(b) THE MEAT PACKING INDUSTRY

No similar figure is available as to the rated capacity of the meat packing industry in Canada. However, present indications are that the industry as a whole is operating well under its full capacity potentialities. The Dominion Bureau of Statistics' *Report on the Slaughtering and Meat Packing Industry, 1950*, shows a considerable reduction in the number of animals slaughtered in the meat packing industry in 1950 as compared with 1944, when it is assumed the industry was operating at or near full capacity. The number of cattle

slaughterings show a drop of 8.37 per cent., sheep and lambs show a reduction of 46.7 per cent., while hogs declined by 47.3 per cent. The overall decrease in the number of animals slaughtered in 1950 as compared with 1944 was approximately 40 per cent.

Much the same conclusion is reached in a publication entitled "*Livestock Marketing in Western Canada*" which was published by the Saskatchewan Department of Co-operation and Co-operative Development in co-operation with the Economics Division of the Federal Department of Agriculture. On page 80 of the report, attention is drawn to the problem of estimating the capacity of the meat packing industry. The Report gives the following information:

"Some idea of the relationship of recent slaughterings to plant capacity as judged by highest monthly slaughter during the heavy wartime runs may be seen by an examination (of the following table) which compares numbers of livestock processed in each of the western provinces of the peak months of 1949 with numbers processed in the peak months during the war.

**Inspected Slaughterings of Cattle, Calves, Hogs and Sheep in Western Provinces
Highest Month in 1949 Compared with Highest Month During the War Years
(Number of Head)**

	CATTLE		CALVES	
	1949	Demonstrated Capacity	1949	Demonstrated Capacity
Manitoba.....	43,030 (Nov.)	71,148 (Nov. '45)	16,697 (Sep.)	17,634 (June '45)
Saskatchewan.....	11,643 (Oct.)	24,423 (Nov. '45)	3,423 (Sep.)	4,055 (Aug. '45)
Alberta.....	24,510 (Nov.)	46,561 (Nov. '45)	9,303 (Sep.)	9,673 (July '45)
B.C.....	11,310 (Nov.)	15,513 (Nov. '45)	4,654 (Oct.)	3,444 (Nov. '45)

	HOGS		SHEEP AND LAMBS	
	1949	Demonstrated Capacity	1949	Demonstrated Capacity
Manitoba.....	75,940 (Nov.)	239,269 (Dec. '43)	16,786 (Oct.)	64,270 (Nov. '45)
Saskatchewan.....	39,994 (Dec.)	134,613 (Dec. '43)	3,014 (Oct.)	9,951 (Nov. '45)
Alberta.....	98,335 (Dec.)	247,585 (Mar. '44)	10,092 (Oct.)	17,551 (Nov. '45)
B.C.....	27,105 (Nov.)	24,514 (May '45)	10,061 (Oct.)	16,270 (Oct. '45)

In almost all cases the numbers processed in 1949 were far below wartime peaks. In Manitoba the reduction in cattle slaughterings from demonstrated capacity was not as great as in the case of hogs. Slaughterings were approximately 60 per cent. of the wartime peak. In Saskatchewan facilities were being used at a rate of

somewhat less than half of the demonstrated capacity. In Alberta cattle slaughterings were only slightly over half capacity."

In view of the foregoing information, it would be fair to conclude that the meat packing industry today is operating at much less than full capacity.

Appendix III

SUPPLEMENTARY GENERAL STATEMENT WITH REFERENCE TO ALBERTA'S ALTERNATIVE PROPOSAL

We greatly regret that the Brief submitted by the Alberta Government was not made available to us until very recently. The matter of analyzing and replying to this submission was therefore somewhat impaired.

The unusual nature of the Brief, and its bearing on the South Saskatchewan Project under review by this Commission, makes it necessary that some general reference be made. I wish therefore to make some general observations on this Brief which will be dealt with in greater detail by Mr. Pope, Counsel for the Government of Saskatchewan, and Mr. Scammell, in charge of water administration for the Province of Saskatchewan.

I note the Alberta Brief constantly refers to and deals with the entire Saskatchewan River Basin. It is therefore worthy of mention that the Saskatchewan River as such actually begins at a point some forty miles east of Prince Albert, Saskatchewan, where the two rivers—the North Saskatchewan and the South Saskatchewan—join to become the Saskatchewan River from that point on. The two rivers, by virtue of natural physical circumstances, are two entirely separate and independent watersheds. This is illustrated by the fact that at their points of entry into Saskatchewan, the two rivers are nearly 200 miles apart.

The terms of reference to this Commission are:

- (1) Whether the economic and social returns to the Canadian people on the investment in the proposed South Saskatchewan River Project (Central Saskatchewan Development) would be commensurate with the cost thereof;
- (2) Whether the said Project represents the most profitable and desirable use which can be made of the physical resources involved.

It can only be assumed that since the South Saskatchewan River Project is mentioned in the first part of the reference, the second part refers to the natural physical resources of the South Saskatchewan River. This has been, and continues to be, our interpretation of the terms of reference placed before this Commission. The point is emphasized by the fact that by far the greater part of the water resources of the South Saskatchewan River beyond the border of Saskatchewan can only be used to advantage for irrigation in Saskatchewan, and for power both in Saskatchewan and Manitoba; and if these waters are not utilized for these purposes in Saskatchewan they will forever run wasted to the sea.

The Alberta Brief proposes a man-made alternative method of diverting water from the Red Deer River and the head waters of the North Saskatchewan River and hence by a lengthy artificial

canal approximately midway between the two rivers at point of entry into Saskatchewan. This proposed canal, which follows a circuitous route where seepage loss will be great, will, it is assumed, irrigate lands alongside a huge natural river with its waters running waste. In our opinion, this proposal as an alternative (and that's what it is—not a combined project, as mentioned in the Alberta Brief) confuses the terms of reference to this Commission and, to say the least, is fantastic as an alternative when compared to the Central Saskatchewan Project envisaged. The alternative proposal does not represent a co-ordinated programme of water development for drainage basins but the direct opposite since it ignores entirely the utilization of the main waters of the South Saskatchewan River for irrigation, power, flood control and municipal purposes so greatly required in Saskatchewan.

The two projects, by natural features, are completely separate and should be developed separately. Doing so will not impair the development of either project in any way. Co-ordinated separate development of these projects is in no way affected by an artificial boundary dividing the drainage area, as mentioned in the Alberta Brief. Again, the direct opposite is the case because, as intended by nature, the South Saskatchewan River flows unimpeded across this artificial boundary. The principal question to be decided is: Will the water in this drainage basin, flowing across an artificial jurisdictional boundary, remain unutilized and wasted forever because of an artificial boundary dividing the drainage areas? To propose a man-made alternative would have this precise effect.

The alternative proposal ignores entirely the use of a large body of water in a natural drainage basin. It is also the direct opposite of any co-ordinated

programme for basin development. This line of thinking indicates that an artificial boundary dividing two government jurisdictions has some influence towards preventing or stalling the development of natural drainage basins. The alternative project is clearly inconsistent with a co-ordinated programme of basin development. Wherever possible, waters within such natural drainage basins should first be utilized before trying to do what nature did not do by resorting to artificial alternatives to natural drainage areas.

We are not opposed to two separate projects. In fact, we are greatly interested in any additional irrigation which might be made possible in Saskatchewan as a result of further studies being made of the Alberta proposal as a *separate* project. We do maintain, however, that these further studies should not occasion any delay in proceeding with the Central Saskatchewan Development because this project represents the greatest possible national benefit to be derived from the physical resources involved. The detailed reasons for our attitude in this regard will be presented by Mr. Pope and Mr. Scammell.

In our Brief, already submitted, we have pointed up the urgent need for immediate development in Saskatchewan. The suggestion contained in the Alberta Brief, that the Project be delayed for further study, will occasion some surprise and disappointment to the many people in Canada who support this Project. It is noteworthy that, by comparison, Alberta has already received an allocation of water through the Inter-provincial Board of 1,256,000 acres against an allocation to Saskatchewan of 30,000 acres, and has, in addition, already received extensive assistance from the Federal Government for irrigation development on large projects. The Al-

berta Brief states that 1,721,400 irrigable acres are allowed for in Alberta, and then follows with the amazing statement that the Province of Alberta can give no assurance that irrigation development in that province will be confined to that acreage.

However, it is encouraging to note that people now generally consider that on the basis of need and urgency, development of the South Saskatchewan Project cannot be postponed any longer. It is particularly heartening to note that there are public men in Alberta who take an entirely different viewpoint in support of this Project. For example, on page 3,946 of the House of Commons' Hansard for June 28, 1952, Solon Low is quoted as follows:

"Mr. Chairman, I think this has been the finest debate I have heard in this house on the subject of the South Saskatchewan River Project. I was delighted to hear both the leader of the opposition and the Right Honourable Prime Minister express views on the subject tonight. It seems to me that in their cogent statements can be found great comfort and hope for the people, not only of Saskatchewan but of all Canada, who have been wanting to see this great project completed at the earliest possible time."

A further quotation from Solon Low's remarks in the House of Commons, appearing on page 3,947 of the Hansard of June 28, 1952, is as follows:

"There is just one thing I would like to say by way of encouragement to my friends in Saskatchewan. I want to see Saskatchewan get that project on the South Saskatchewan River as quickly as they can because I know what it will do for their province and for the rest of Canada as a whole. We in the Province of Alberta have recognized so fully the value of that project to Saskatchewan and to the west that we have been prepared for some years to share our waters that rise on the eastern slopes of the Rockies in our province. We have already arranged that allocation of water through an agreement made with the federal government in 1948."

Unfortunately, this is incorrect. An allocation to this project has not yet been made—and in a few moments I will

present the reasons why we have not received an allocation. I should mention that Mr. Low went on to point up the great handicaps in Saskatchewan towards carrying the burden of public services in a province of great distances and low carrying capacity. He mentioned that the provincial burden of financial contribution for this national development project should be less in Saskatchewan than in Alberta because for many years Saskatchewan has been shouldering a heavy burden of cost as a consequence of Dominion settlement policies prior to and after 1931 when the resources were handed over to this province. The observations of Mr. Low are very encouraging and are in direct contrast to the viewpoints expressed by other public men in Alberta.

The remarks of Mr. Blackmore, M.P., House of Commons, in the same debate, which appear on page 3,956 of the Hansard of June 28, 1952, are also worthy of quotation:

"Alberta by good fortune, because of the resources she has, has been placed in a better position financially than Saskatchewan. In my judgment Saskatchewan has done the very best she could with the resources at her disposal. The Minister of Agriculture knows, better than any other person in Canada, how meagre those financial resources are compared with the tremendous responsibilities that rest upon the Government of Saskatchewan. I believe the minister will bear me out in that.

"I thought it well to make those three or four comments before closing, just to reinforce what the Hon. member for Peace River said. I shall back the member for Peace River every inch of the way. I too do not believe that it is in any degree fair to the people of Saskatchewan to ask them to assume half the cost of building this great irrigation project.

"I should like also to express appreciation to all the members who have participated in this debate. I believe that as a result of this debate it will be made easier for the minister to get the support from all over Canada which he ought to have. As a result of bringing together the support from all of Canada, we shall be able to get this great project completed at an early date and put what we might call the capstone on these irrigation projects as well. This would show our intention, as a nation, to reimburse

to some extent at least the people who have settled in that area of the Palliser triangle."

Now I wish to quote from paragraph 4, page 7, of the Alberta Summary Brief, as follows:

"The Alberta Government believes that until a thorough investigation of one overall Alberta-Saskatchewan Project has been completed, the best uses of the water reservoirs of the Saskatchewan River drainage basin cannot be determined, and they would suggest that such an investigation be initiated by the Prairie Provinces Water Board."

I note, particularly, the suggestion to the Commission that a further study of the combined projects be referred to the Prairie Provinces Water Board. I wish to state in this connection that this matter, at the suggestion of Alberta's representative on the Prairie Provinces Water Board, has already been referred for study to the Prairie Provinces Water Board and a report submitted by that Board. A copy of this report and minutes of this meeting will be filed for the information of the Commission by Mr. Pope and Mr. Scammell in view of the representations made by Alberta that a further inquiry by the Prairie Provinces Water Board be undertaken. There was also correspondence which I had with Mr. Ure and Mr. Gardiner, and I attach copy of this correspondence to this statement for the information of the Commission. I mention this because, when the Saskatchewan representative on the Board, Mr. Scammell, during the Water Board meeting of September 5 and 6, 1951, moved that in view of the information received and of the fact that the necessary water was available, the Board should recommend an allocation to this project. However, two representatives on the Board felt that the Board should wait until they had received the report of the Royal Commission (newly appointed at that time) and to treat the Commission's report as additional evidence. Alberta's representative, the minutes of the meeting reveal, agreed with

this view but added that the alternative combined project should be looked into, preferably by the Royal Commission. It is most interesting, therefore, to note the suggestion now made to the Commission that the Prairie Provinces Water Board initiate still another investigation:

We are certainly not against, but favour, any further useful studies that might be required to make greater use of our water resources to the benefit of the provinces concerned. However, we are very much opposed to any attempt to directly or indirectly delay or stall this urgently required irrigation and power project in Saskatchewan. We are quite certain that in light of the evidence already submitted, any attempt to do so is not in the national interest or in the interest of the provinces concerned.

We do not agree at all that the alternative proposal would be less costly. Indeed, careful scrutiny of costs balanced against benefits indicate that the alternative would be much more costly from the point of view of original cost, maintenance and loss of irrigation and resource power energy which could not be made up in any other way. It is also clearly evident that if the alternative project were proceeded with, the water supply would be most uncertain and would relegate Saskatchewan to the position of a "tailender". It is borne out by irrigation experience that water users at the end of the ditch in years of low flow often look in vain for water when needed. Saskatchewan does not relish the thought of being a "tailender" in any irrigation scheme when a large volume of "natural flow" water is so readily available. A thin, man-made water lifeline is against all principles of successful irrigation. For irrigation to be successful and to justify investment, an ample water supply must be beyond question. A good

illustration might be found in the diversion ditch constructed as a source of water supply for the City of Moose Jaw. This emergency source of water supply by artificial canal has been made famous for the little water it actually carries to the reservoir basin—a maximum of 40% of the water pumped into this ditch actually reaches the reservoir. I am informed that the cost of loss of water by seepage in the proposed canal would offset any pumping costs associated with the Central Saskatchewan Development. We submit that it is not in the public interest to expose a costly irrigation project to man-made hazards. We would therefore suggest that the Alberta proposal does not represent the most profitable and desirable use of the physical resources involved.

In regard to the need for pumping at the South Saskatchewan dam site, the Alberta Summary Brief, on page 2, paragraph 1, states:

“For some time to come and possibly forever, the construction of irrigation facilities should be confined to those areas which can be reached by gravity canals or by low lift pumps, where exceptional conditions warrant the use of such pumps.”

In other words, only those lands which can be reached by low lift pumps or gravity should be irrigated. Alberta has 700,000 acres still to be developed on this basis, and says, in effect, “Saskatchewan should continue to experience all the hazards of drought until these acres are developed”. And, perhaps not even then, I take it, even though the alternative proposal is not feasible!

We maintain that it is much more costly and uneconomic to divert water great distances than it is to pump from a large natural reservoir where only a minimum of the power made available is required for pumping. However, in contrast to the above viewpoint, is the further observation made in the last paragraph on

page 4 of the Alberta Summary Brief, which states:

“The point to be noted, however, is that all irrigable lands provided for in Alberta are or can be, and should be, under gravity canals, but if it can be considered economically feasible to pump water to great heights for the irrigation of lands in Saskatchewan, then it must be even more feasible and economical to pump water to the same great heights for lands in Alberta.”

This is a surprising statement because, in the first instance, the South Saskatchewan Project is condemned because pumping is involved. The second statement suggests that if it can be done in Saskatchewan, it would be even more feasible and economical to pump water in Alberta. It is surprising how economic things can become in Alberta in the minds of some people. These contradictory viewpoints greatly weaken the objections raised to the South Saskatchewan Project. This merely seems to be “me too-ism” carried to an extreme.

It is well, also, to be reminded that where a great need is manifest at a given point on a natural drainage basin and physical features for a large dam and storage reservoir make possible a multi-purpose project providing irrigation, flood control, municipal and industrial water supply and abundant electrical power possibilities both at the site and down stream, then, surely, the common-sense of a layman understands that using a minimum of that power for irrigation pumping is feasible and the proper thing to do. We know that gravity irrigation is desirable, but if you haven't got it at the point of greater need, you haven't got it, and we should not be denied use of South Saskatchewan River waters because someone else can irrigate by gravity flow. The accepted criterion of national investment is predicated on the national benefits that can be derived from the development of physical resources, and those national benefits are greatest where the national liability of

need is the greater. We hold that the greatest national benefits accrue to the Central Saskatchewan Development.

EQUITABLE APPORTIONMENT OF INTER-PROVINCIAL STREAMS

As a result of the artificial boundary separating Canada and the United States, the principle of equitable apportionment of water resources flowing from one country to another is accepted as a legal right. No province is more greatly concerned that this principle be adhered to than is the Province of Alberta. We feel that since the provinces have been granted ownership of water resources by agreement with the Dominion Government, the principle of equitable apportionment on the basis of need and beneficial use should also apply to waters flowing across provincial boundaries. It is a fact that water resources do flow across artificial boundaries, and it is also a fact that artificial boundaries define separate governmental jurisdictions and such jurisdictions imply responsibilities for public services at all levels, both provincial and municipal. Standards of services and standards of living for people within such jurisdictions are also involved, for which federal, provincial, and local governments have a direct responsibility. Because of this, provinces have certain recognized fundamental rights to share in the benefits of water resources development on streams flowing across provincial boundaries. The fact that artificial boundaries were created, rather than argue against, argue for the South Saskatchewan Project. This does not mean that a co-ordinated programme of basin development will be impaired, but it does mean that such a programme must be devised to permit a sharing of benefits as far as physically possible as an accepted guiding principle. To approach the matter in any other way would permit greatest benefits to areas most fortunately situated because of natural features. Such

an approach, if accepted, would result in permanently depressed areas starved by the lack of resources development and a continued liability to the rest of the nation. We again reiterate that the most profitable and desirable use of physical resources can best be attained by accepting the principle, wherever possible, of equitable apportionment of water on the basis of need and beneficial use.

In summary, may I briefly set out the following points:

1. The two projects by natural features are independent and complementary separate developments and no delay in proceeding with the South Saskatchewan Project should be occasioned by further studies regarding possible diversions from the North Saskatchewan watershed.
2. Separate development is consistent with and has all the advantages of a co-ordinated programme of water utilization for the drainage basins.
3. Separate development implies full utilization and use of drainage basin waters for power and irrigation throughout the entire basin.
4. The combined alternative project would result in the failure to utilize some 5 million acre feet of water annually. This waste is absolute and cannot be made up by alternative diversion and represents a loss of millions of dollars annually in wasted resources. This water waste represents power and irrigation losses to Saskatchewan and Manitoba.
5. The South Saskatchewan Project will increase the irrigation and power potential of the two river basins.
6. It is not necessary or practical to divert water for the Saskatchewan Project.

7. Natural stream flow available in the South Saskatchewan River should first be developed before diversions are considered.
8. Pumping at the dam site where surplus power is readily available is preferable to uncertain and costly alternative diversions.
9. Finally, the proposed combined alternative project is not a practical alternative because of physical features, cost of construction and maintenance of a long canal, plus loss of water by seepage and questionable supply for irrigation, plus a further

cost to replace lost power at the proposed dam site and the benefits of more economic power down stream. The loss of abundant cheap water for municipal supply, particularly to the Cities of Moose Jaw and Regina, cannot be overlooked. The added annual cost of pumping from the present river level would be a continuing financial cost to the national government.

We are sure that the Commission will carefully consider these factors relating to the most profitable and desirable use which can be made of the physical resources involved.

Part II

AGRICULTURAL POTENTIAL

OF THE

CENTRAL SASKATCHEWAN DEVELOPMENT

Submitted by

R. E. Mackenzie, Director,
Plant Industry Branch,
Department of Agriculture

The fundamental problem of agriculture over the open plains region of Saskatchewan is drought. The history of farming in this province during the past 50 years shows clearly the unstable nature of production. This history is marked with the records of recurring droughts, crop failures, lack of feed reserves for livestock and the expenditure of many millions of dollars for agricultural aid.

One of the solutions to drought and resulting agricultural instability is irrigation development. By building a dam, as proposed at the Coteau site on the South Saskatchewan River, it will be possible to command nearly half a million acres for irrigation. The best engineering advice available indicates that it is entirely feasible to construct such a dam. It has been stressed that the building of this dam would produce many important benefits. Electric power would be developed for rural electrification and industrial use, stream flow would be regulated, recreational facilities would be provided and municipal water supplies would be improved. However, the most important reason for constructing the dam is to bring water to some half million acres of farming land now subject to drought and in that way to rehabilitate the agriculture of this area as well as surrounding dry land areas and thus give greater stability to the whole agricultural economy of Saskatchewan. This brief proposes to show very clearly that the Central Saskatchewan Development is sound from an agricultural standpoint, that it is essential to future Canadian and world food needs and that high production and returns will be obtained.

1. Agronomic Aspects

The basis of successful irrigation farming in any area is suitable soil types, desirable topography, good water supply and an arid climate with a comparatively long frost-free season.

Approximately 430,000 irrigable acres in the proposed development area have been classified in the three top grades according to suitability for irrigation. A high proportion of these soils are lighter textured and represent the most desirable types from the standpoint of applying water. They will take water readily, provide good sub-surface drainage and are practically free from alkali salts. From a fertility standpoint the soils can be regarded as equal to that of similar soil types in any other irrigated area of Western Canada.

Topographic features of the development area are very favourable to irrigation. The absence of steep slopes or very flat areas and the existing opportunities for natural drainage are all factors which will allow water to be applied efficiently without danger of waterlogging the soil or the formation of a high water table.

From the standpoint of soils and topography, it cannot be denied that the proposed development area rates very highly. These extremely favourable soil and topographic conditions are a striking contrast to other irrigation projects developed to date in Saskatchewan which have had to be confined principally to low-lying areas of heavy textured soils containing moderate to heavy concentrations of soluble salts. These soils have presented obvious problems. The proposed Central Saskatchewan Development presents an entirely different picture. Here, for the first time on a large scale, it will be possible to develop irrigation on upland soils of good texture, fertility and topography. There can be no doubt that high production and a permanent type of irrigation agriculture will develop in the area.

With respect to climate, available data has shown that the mean annual precipitation is too low for anything more than a subsistence type of dryland agri-

culture. On the other hand, experience has indicated that the drier the area, the more highly developed irrigation farming becomes. Planned irrigation practices develop and the farmers count less on rainfall as a factor in crop production.

The mean temperatures and the length of the frost-free period prevailing in the area implies that much the same kinds of crops as are grown in the irrigated districts of Southern Alberta can be produced in Saskatchewan.

With regard to water supply, studies and records show that there is sufficient available to meet the requirements for a full duty of water on the project.

Thus from an agronomic standpoint, the soil, topographic, climatic and water supply features of the project are equal or superior to any other project yet developed in Western Canada. There is every reason to believe that high crop production will occur and this assumption is being borne out by preliminary results obtained on the Experimental Area on the Pre-Development Farm at Outlook.

2. Agricultural Development

When land is brought under irrigation on the project and during the first few years of settlement annual crops such as coarse grains will be grown principally. However, once the land is levelled and ditches properly located, a cropping programme based on sound rotational and fertility principles, along with efficient use of water, will be required to achieve high production and develop a permanent type of agriculture. This will be accomplished in a relatively short time, much sooner than has been the case on older projects. Today, there is an immense fund of knowledge based upon experience, research and experimentation available to the new irrigation farmer. In addition we have the benefit of experience on older projects to assist in avoiding mistakes which have been made in the

past and in expediting proper development. Furthermore, considerable experimental data from the work being conducted by Experimental Farms Service at Outlook, as well as the results from a large-scale, well-planned, practical farm rotation being carried on by the P.F.R.A.'s Pre-Development Farm at Outlook will be available as a guide and demonstration for new settlers. By the time the project comes into operation there will be more sound, practical information available for new irrigation farmers than on any other project developed in Western Canada to date. This fact is one of the most significant but perhaps overlooked features of agricultural development on the Central Saskatchewan Development. Coupled with a sound extension programme which will be instituted by the Saskatchewan Department of Agriculture, it means that individual farm cropping programmes, aimed at realizing and maintaining high production, will be developed in a very short time.

Experience in other irrigated areas has demonstrated clearly that straight grain production cannot be carried on under irrigation at a profitable level. The need for rotations which include forage crops along with the use of fertilizers and manure is essential for maximum production. In a proper rotation in this area a minimum of 50% of the acreage should be devoted to perennial forage crops for hay, pasture or seed production and the remainder used for annual crops such as cereals and various specialty crops. In the early years of development a forage-cereal crop-livestock economy is visualized. In later stages some cereal crop production would be replaced by specialty crops such as sugar beets, potatoes and peas, beans and corn for canning.

A new and rapidly developing feature of irrigation farming is the use of seeded pastures. Evidence to date indicates that

irrigated pastures can give returns comparable to any known specialty crop. In Washington, irrigated pastures have produced nearly 1,000 pounds of beef per acre. In Utah, dairy cattle have given gross returns on irrigated pastures of over \$200 per acre. In Southern Alberta, the use of irrigated pastures is fast developing as a profitable enterprise for beef and dairy cattle and for sheep. At the Swift Current Experimental Station irrigated pastures carry 11 head of mature sheep per acre, compared to one head for 6 acres on native pastures. In the development area irrigated pastures will undoubtedly assume an important place and will in effect be a specialty crop.

We believe the agricultural development of the Central Saskatchewan area will be based on a livestock economy. Various types of livestock enterprises can be carried on such as (1) farm beef herd; (2) the purchase of calves or yearlings in the fall for winter feeding and spring sale, or for winter feeding and summer pasturing for fall sale; (3) dairy herds for fluid milk or cream production; (4) farm flocks of sheep; (5) hog production, particularly in conjunction with dairying.

3. Expected Production and Returns from a Typical Irrigated Farm in the Central Saskatchewan Development

In order to establish what the project will contribute to the national economy in terms of production and revenue, it is proposed to examine the returns which can be expected from a typical irrigated farm in the development area. A typical farm is envisaged as being 160 acres in size of which 144 acres are available for crop production after making allowances for the farmstead, non-irrigable portions and loss from ditches. Two stages of development will be projected, the first based on a livestock, cereal grain

economy and applicable to the initial development stage; the second based on livestock, cereal grain and specialty crop production and applicable to the mature development stage.

At both stages a minimum of 50% of the acreage in forage crops and 50% in annual crops is assumed. These crops are grown in a systematic rotation which includes regular application of fertilizers and manure to maintain fertility.

The livestock enterprise is illustrated in two ways: (a) a farm beef herd is maintained; (b) calves are bought in the fall, wintered on the farm, and pastured during summer and sold in the fall.

Yield levels assume good operation and management but are short of the maximum which could be obtained.

The price levels forecast are less than current prices and, based on expected future world food requirements, are considered to be most conservative.

(I) ORGANIZATION, PRODUCTION AND COSTS OF A TYPICAL LIVESTOCK-CEREAL CROP FARM, CENTRAL SASKATCHEWAN DEVELOPMENT—INITIAL DEVELOPMENT STAGE

Cropping Programme

A 160-acre farm is selected as an average sized unit. On this farm 144 acres are available for cropping. This acreage is divided into 12 fields of 12 acres each for rotation purposes. The remaining 16 acres are taken up by the farmstead, non-irrigable portions and loss through ditches.

Livestock Programme

Two examples of livestock enterprises are used. In the (A) enterprise a herd of 26 beef cows is maintained, 23 calves are wintered each year, 21 yearlings are sold each year in the fall. All cattle are pastured entirely on the farm.

In the (B) enterprise 70 head of beef calves are purchased in the fall, fed dur-

ing winter and pastured on the farm in the summer. These are sold in the fall. Sales are based on 67 head, allowing for a mortality of 3 head.

(A) CROPPING PROGRAMME, YIELDS AND PRODUCTION:

Crop	Fields	Yields/acre	Total Production
Hay.....	3(36 acres)	2.5 tons	90 tons
Wheat.....	3(36 acres)	35 bushels	1,260 bus.
Oats.....	1(12 acres)	80 bushels	960 bus.
Barley.....	2(24 acres)	50 bushels	1,200 bus.
Pasture.....	3(36 acres)	2 head carrying capacity	

Hay and Grain Consumed by Livestock.

Livestock Enterprise (A)	
Hay—65 tons (surplus 25 tons)	
Oats—295 bus. (surplus 640 bus. excluding seed)	
Barley—295 bus. (surplus 855 bus. excluding seed)	
Livestock Enterprise (B)	
Hay—70 tons (surplus 20 tons)	
Oats—960 bus. fed on the farm and used for seed.	
Barley—1,200 bus. fed on the farm and used for seed.	

(B) INCOME AND EXPENDITURE SUMMARY

Income		
Livestock Enterprise (A)		Livestock Enterprise (B)
\$ 1,375.00	Wheat—1,100 bus. @ \$1.25.....	\$ 1,375.00
769.50	Barley—855 bus. @ 90c.....	
320.00	Oats—640 bus. @ 50c.....	
500.00	Hay—25 tons @ \$20.00.....	
	20 tons @ \$20.00.....	400.00
3,024.00	Cattle—(A) 21 X 900 @ 16c.....	
	(B) 67 X 900 @ 16c.....	9,648.00
\$ 5,988.50	Total.....	\$ 11,423.00

Expenditures		
Livestock Enterprise (A)		Livestock Enterprise (B)
\$ 1,350.00	Total machinery cost—15% of \$9,000.....	\$ 1,350.00
300.00	Gas, oil and grease.....	300.00
100.00	Taxes.....	100.00
800.00	Hired Labour.....	800.00
350.00	Threshing.....	350.00
350.00	Buildings, fences etc. 7% of \$5,000.....	350.00
80.00	Fertilizer.....	80.00
156.00	Servicing costs.....	
300.00	Miscellaneous supplies.....	300.00
	Purchase of calves 325 lbs. X 18c X 70.....	4,095.00
\$ 3,786.00		\$ 7,725.00
2,202.50	Gross returns.....	3,698.00
1,000.00	Living costs.....	1,000.00
\$ 1,202.50	Return to Irrigation.....	\$ 2,698.00
\$ 7.52	Per Acre Return to Irrigation.....	\$ 16.86

(II) ORGANIZATION, PRODUCTION AND COSTS OF A TYPICAL LIVESTOCK-CEREAL AND SPECIALTY CROP FARM—CENTRAL SASKATCHEWAN DEVELOPMENT—MATURE DEVELOPMENT STAGE

Cropping Programme

The same sized farm unit as was selected for the initial development stage

will be used in this budget estimate. The rotation is the same with the exception that one field of wheat is replaced by 12 acres devoted to a specialty crop. For the purpose of illustration, sugar beets are selected although the specialty crop could conceivably be potatoes, peas, beans or corn.

Livestock Programme

types of livestock enterprises used for
Returns are based on the same two the initial development stage.

(A) CROPPING PROGRAMME, YIELDS AND PRODUCTION

Crop	Fields	Yields/acre*	Total Production
Hay.....	3(36 acres)	3.0 tons	108 tons
Wheat.....	2(24 acres)	40 bus.	960 bus.
Oats.....	1(12 acres)	85 bus.	1,020 bus.
Barley.....	2(24 acres)	55 bus.	1,320 bus.
Sugar beets.....	1(12 acres)	13 tons	156 tons
Pasture.....	3(36 acres)	2 head carrying capacity.	

*—A slightly higher level of yields is assumed in the mature development because of previous rotation of crops and continued use of manure and fertilizer over a period of years.

*Hay and Grain Consumed by Livestock**

Livestock Enterprise (A)

Hay—65 tons (surplus 43 tons)
Oats—295 bus. (surplus 700 bus. excluding seed)
Barley—295 bus. (surplus 975 bus. excluding seed)

Livestock Enterprise (B)

Hay—70 tons (surplus 38 tons)
Oats—1,020 bus. fed on the farm and used for seed.
Barley—1,320 bus. fed on farm and used for seed.

*—Grain consumption makes allowance for feeding a flock of chickens and raising a litter of pigs, from which additional revenue would be obtained.

(B) INCOME AND EXPENDITURE SUMMARY

		Income		Livestock Enterprise (B)
Livestock Enterprise (A)				
\$ 1,125.00	Wheat—900 bus. @ \$1.25.....	\$	1,125.00	
350.00	Oats—700 bus. @ 50c.....			
877.50	Barley—975 bus. @ 90c.....			
860.00	Hay—43 tons @ \$20.00.....			
	38 tons @ \$20.00.....			760.00
2,184.00	Sugar beets—156 tons @ \$14.00.....			2,184.00
3,024.00	Cattle—(A) 21 X 900 @ 16c.....			
	(B) 67 X 900 @ 16c.....			9,648.00
\$ 8,420.50	Total.....	\$	13,717.00	

		Expenditures		Livestock Enterprise (B)
Livestock Enterprise (A)				
\$ 1,800.00	Total machinery cost—15% of \$12,000.....	\$	1,800.00	
300.00	Gas, oil and grease.....		300.00	
100.00	Taxes.....		100.00	
800.00	Hired labour.....		800.00	
350.00	Threshing.....		350.00	
350.00	Buildings, fences, etc. 7% of \$5,000.....		350.00	
120.00	Fertilizer.....		120.00	
156.00	Servicing costs.....			
300.00	Miscellaneous supplies.....		300.00	
1,500.00	Cost of producing sugar beets (12 X \$125.00).....		1,500.00	
	Purchase of calves 325 lbs. X 18c X 70.....		4,095.00	
\$ 5,776.00		\$	9,871.00	
2,644.50	Gross returns.....		4,002.00	
1,000.00	Living costs.....		1,000.00	
\$ 1,644.50	Return to Irrigation.....	\$	3,002.00	
\$ 10.28	Per Acre Return to Irrigation.....	\$	18.76	

The budget estimates presented for two types of livestock enterprises in the initial and mature development stages represent returns to irrigation which can be readily realized on this project. The yields assumed are modest, the prices are conservative. It is realized that the two types of livestock enterprises illustrated cannot be universally applied. If the farmer is to purchase calves in the fall, he would be required to make a fairly large capital outlay. Not all would be able to do so. This problem could be partly overcome by co-operative credit financing. At the same time, the availability of supply of calves might place some limitation on the extent to which this enterprise could be followed, and thus, beef production on many farms would be along the lines of the farm beef herd. Alternative farm livestock enterprises, producing similar or slightly higher returns, would be sheep and dairy production.

In regard to specialty crop production in the mature development phase, while sugar beets are used for illustrative purpose they would not necessarily be grown over the entire project. Other specialty crops will no doubt be grown. The returns from sugar beets given in the budget are used to illustrate the approximate returns from specialty crops.

On this basis it may be expected that irrigated land on the Central Saskatchewan Development will produce a return to irrigation of between \$7 and \$16 per acre in the initial development stages, with the figure of \$10 per acre as an average value.

In the mature development stage the project can be expected to return between \$10 and \$18 per acre to irrigation with \$14 per acre as an average value.

On the basis of 430,000 acres under irrigation the project can be expected to return over \$4,000,000 annually to

irrigation in the initial development phase and slightly over \$6,000,000 annually in the mature development phase.

(III) CONTRIBUTIONS OF THE CENTRAL SASKATCHEWAN DEVELOPMENT TO NATIONAL AGRICULTURAL PRODUCTION

By projecting the budget estimates of yields over the entire project it is possible to arrive at the major contributions, in terms of production which the development will make to the Canadian agricultural economy. This will be done for six products: wheat, oats, barley, hay, specialty crops and livestock.

Wheat

In the initial development stage the project will produce 1,100 bushels of wheat for sale per farm or a total of nearly 3 million bushels. Using the 1951 export price of \$1.79 per bushel for No. 3 Northern wheat, the value of wheat production would be \$5,370,000.

In the mature development stage less wheat would be produced; some 2,430,000 bushels which, on the above valuation would be worth \$4,350,000.

Barley

On the basis that well over half the barley produced on the project would be fed to livestock, an average of 425 bushels per farm in the initial development phase and 485 bushels in the mature development stage would be available for sale, or a total production of 1,147,500 bushels and 1,309,500 bushels.

Assuming the 1951 export price of No. 1 feed barley at \$1.25 per bushel, the value of barley production would be \$1,434,375 and \$1,636,875, for the two development stages.

Oats

Assuming again that well over half the oats produced would be fed on farms, about 320 and 350 bushels per farm or a total of 864,000 bushels in the initial

development stage and 945,000 bushels at the mature development stage would be available for sale. The value of production using the 1951 export price of 78.6 cents per bushel for No. 1 feed oats would be \$679,000 and \$742,500 respectively.

Hay

The surplus production of hay in the initial development stage would amount to an average of about 22 tons per farm and 40 tons in the mature development stage. The total amount of surplus hay would be 59,400 tons and 108,000 tons, which at a value of \$20 per ton would be worth \$1,188,000 and \$2,160,000.

Specialty Crops

In the mature development stage 12 acres per farm will be devoted to specialty crops. Using sugar beets as an example

with an average yield of 13 tons per acre, the project would produce 421,200 tons of sugar beets. Assuming 16% sugar content this tonnage would yield 134,784,000 pounds of sugar. At a retail price of 12c per pound the value of production would be \$16,174,080.

Livestock

Beef production would vary from 20,700 pounds per farm, assuming a farm beef herd, to 38,525 when calves are purchased and fed for a year. Based on a nearly equal division between these two types of enterprises, a per farm beef production of 30,000 pounds is indicated. Assuming a farm selling price of 24c which is 60% of retail value, a price of 40c is used to calculate the value of livestock production. For the project this would amount to \$31,104,000.

Summary

Annual Contributions to National Output From the Central Saskatchewan River Development

	Initial Development Phase	Mature Development Phase
Wheat.....	\$ 5,370,000	\$ 4,350,000
Barley.....	1,434,375	1,636,875
Oats.....	679,000	742,500
Hay.....	1,188,000	2,160,000
Specialty Crops.....	.....	16,174,080
Livestock.....	32,400,000	32,400,000
Total.....	\$ 41,071,375	\$ 57,463,455
Per Farm.....	\$ 15,211	\$ 21,282

The above amounts must be considered a gross contribution from which it is necessary to subtract the present value of production of the area under dry land conditions.

On the basis of 1,245 farms, averaging 382 acres of cultivated land, a total dry land acreage of 475,590 is indicated, roughly comparable to 2,700 irrigated farms averaging 160 acres in size for a total acreage of 432,000.

At least a third of this acreage would be in summerfallow each year, leaving 288,000 acres for crop production. At present this cropped acreage is devoted mainly to cereal production: 70% in wheat, 16% in oats, 8% in barley and the remaining 6% in other grains and feed crops. Livestock numbers are few and marketings of about 5 head per year are indicated. Production is estimated as follows:

	Acreage	Yield	Total Production
Wheat	201,600	11 bus.	2,217,600 bus.
Oats	46,080	22 bus.	1,013,760 bus.
Barley	23,040	17 bus.	391,680 bus.
Hay	17,280	1 ton	17,280 tons
Livestock			6,225 head

*Value of Production**
(Less feed and seed requirements)

Wheat.....	2,000,000 bus. @ \$1.79	= \$	3,580,000
Oats.....	885,520 bus. @ 78.6	=	696,018
Barley.....	322,560 bus. @ \$1.25	=	403,200
Hay.....	No surplus		
Livestock.....	6,225 X 900 lbs. @ 40c	=	2,241,000
Total.....			\$ 6,920,218
Per Farm (1,245 farms).....			\$ 5,558

*—Based on 1951 prices as used for irrigated farms.

Net Annual Contributions of the Central Saskatchewan Development to National Agricultural Production

Initial Development Stage.....	\$	34,151,157
Mature Development Stage.....	\$	50,543,237

4. Food and the Central Saskatchewan Development

There is much evidence to show that there is little reason to look back at food surpluses and low relative prices for food products, as a guide to what may happen in the future.

The era of expanding agricultural acreage which continued from 1900 to 1930 in North America is now over and

only small areas still await development. Mechanization has since freed large acreages (estimated at about 65 million in United States) for production of human food. No similar frontier can be foreseen for the next 2 or 3 decades at least.

Populations continue to increase. The following table sets out population statistics in Canada's major consumer countries since 1931:

	1931	1941	1951
Canada.....	10,377,000	11,507,000	14,009,000
United States.....	123,643,000	132,638,000	150,161,000
Great Britain.....	44,795,000	46,467,000	50,363,000
Total.....	178,815,000	190,612,000	214,533,000

It seems likely that an era of considerable economic expansion, sparked by discoveries of oil, natural gas, iron ore and uranium as well as by a mounting requirement for food, is in store for Canada. A forecast of well over 20 million people in Canada by 1971 is not optimistic. If the rate of growth and development experienced during the past decade were to continue, and there is every indication it will, this figure will be reached easily.

Regarding forecasts of population in the United States, Joseph S. Davis of Stanford University, in an article, "Our Amazing Population Upsurge", Journal

of Farm Economics, November, 1949, had this to say:

"Ten months ago the standing official forecast for 1970 was, in round figures, 160 million, and this was the figure commonly used by economists. Six months ago, the revised official forecast indicated that this figure would be reached in 1960. Evidence now available strongly suggests that our true population will reach 160 million during 1955, if not earlier."

In discussing future food requirements he went on to say:

"In conjunction with our higher consumption standards, I believe that our demand for milk, meat and other animal products will become such as to put pressure upon our ability to expand the output of these products."

It may be assumed that Great Britain has reached a static point in population

but it is at a considerably higher level than during the thirties. However, F.A.O. estimates that since 1936 world population has increased thirteen per cent. In the Demographic Year Book of the United Nations Statistical Office it is estimated that world population since 1920 has been increasing at just under one per cent. per year. As against this F.A.O. estimated that production of principal food crops in both 1951 and 1952 would be only about nine per cent. above the 1934-1938 average.¹

Income is also a major factor in determining demand for food. It has an important bearing on the kinds of food required. Again there appears to be justification for assuming that food products will enjoy a more favourable price relationship in the future.

Furthermore, with increased mechanization of farms, production costs have become fixed. In addition the services which rural people now require and which are now in effect cannot be supported by the land without good prices for the products produced.

Governments, generally, indicate a determination to prevent the drastic declines in incomes which have occurred in the past. In addition, governments in Canada, the United States and Great Britain have introduced various measures which will tend to offset depression effects. In Canada, for example, family allowances, universal old age pensions, unemployment insurance and other measures would alleviate the effects of depression.

In balancing agricultural benefits of the Central Saskatchewan Project against escalated constructed costs, it seems only fair to assume corresponding increases in future prices for agricultural products; and most unrealistic to assess the value

of production in terms of prices which have prevailed over the past forty or fifty years. These prices were established during a period that witnessed an increase in improved land acreage between 1901 and 1950 of about 160,000,000 acres in United States and Canada. The same period also witnessed a revolution in the techniques of agricultural production. It resulted in freeing, for human food production, about two-thirds of the acreage required to maintain a population of horses and mules which reached a total of almost 30 million in United States and Canada in 1920-21.

Requirements for food will inevitably increase in view of population increases, the industrial expansion taking place in Canada and the role that food now plays in international affairs. There seems ample justification for assuming that:

(a) There is a need for expanding food production.

(b) Agricultural products will command higher prices during the next 20-50 years than they did during the past 50 years.

(c) The Central Saskatchewan Development will play a vital role in meeting the increased demand for food in addition to making a substantial contribution to national income.

5. Summary

As a means of alleviating the serious effects of drought over a wide area of Central Saskatchewan, it is submitted that the proposed development offers an opportunity and a challenge to the Canadian people to make the best use of our two most important natural resources—soil and water.

In terms of agricultural production the project will result in a vastly increased food output, particularly of animal products, in addition to saving various assistance and relief expenditures, supplying a reservoir of assured feed and seed pro-

¹S. C. Hudson, *Economic Annalist*, No. XXII, Feb. 1, 1952.

duction for the drought areas and stabilizing the economy of the province by providing a sure crop area.

Considering only the 430,000 irrigable acres within the project area, the number of farms will be more than doubled and production will be three to four times greater. Hay yields will be increased from an uncertain $\frac{3}{4}$ ton per acre to an assured 3 tons per acre. Instead of 12 acres required to pasture a cow, $\frac{1}{2}$ to $\frac{3}{4}$ of an acre will be enough. In terms of beef, 500 pounds per acre will be produced compared to 40 pounds at present. Summerfallow which occupies over $\frac{1}{3}$ of the acreage will disappear and various types of specialty crops will be grown as well as significant amounts of grain for livestock feed.

On the basis of a conservative valuation of production, the project can be expected to return to irrigation over \$4,000,000 annually in the initial development stage and over \$6,000,000 annually in the mature development stage.

In terms of national production the project is expected to contribute thirty-four million dollars annually in the initial development stage and fifty million dollars annually in the mature development stage over present dry land returns.

The large volume of food which the project is capable of producing will be urgently needed in view of expanding world and national food requirements.

As a national investment the Central Saskatchewan Development is vital to Canada and should be proceeded with immediately.

Part III

INDUSTRIAL DEVELOPMENT

Submitted by

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Saskatchewan Industrial Development Office

As the South Saskatchewan River Project is designed primarily to assist the agricultural industry through the provision of irrigation facilities, the most substantial benefits accruing from this project will take the form of stabilizing and rendering more prosperous the agricultural industry of the development area and other areas of the province.

However, the benefits resulting from the construction of the South Saskatchewan dam will not by any means be limited to the agricultural industry, but will also result in important developments in the fields of industry and commerce, and of tourism.

While the most important benefits will accrue following the completion of the dam and the putting into operation of the irrigation facilities made possible by the dam's construction, benefits to industry and commerce in Saskatchewan, as well as in Canada generally, will become immediately apparent upon the initiation of construction of the dam. Some of these benefits might be listed briefly as follows:

1. Purchase of materials and supplies.
2. Purchase of machinery.
3. Provision of employment for hundreds or possibly thousands of Saskatchewan citizens.
4. Development of a reasonably large community at the dam location providing employment in the construction of houses and at the same time supplementing services to the farming community in the district.

It is difficult to assess accurately what proportion of the expenditure of something over \$100,000,000 will result in increased economic and business activity in the Province of Saskatchewan, but it may be assumed that a large proportion of the total capital costs will be spent in this province and will result in con-

siderably more business activity within the province than would be represented by the actual financial outlay for the project itself.

In addition, substantial economic benefits would accrue to eastern Canada, which would supply the larger proportion of the millions of dollars of machinery and other supplies required to construct the dam.

Although many of the benefits accruing during the period of construction of the dam would be of a transitory nature, the actual operation of constructing the dam with the industrial and commercial activity which such construction would create, would effect some changes in the economic life of the province which would continue on after the date of completion of the dam. These would include the manufacturing establishments set up in the province to manufacture certain materials and supplies for construction. In addition, a new community would have been established at the site of the dam.

More important are the developments which would take place following and as a result of the construction of the dam. These might be listed as follows:

1. Services for an expanding community.
2. Manufacturing establishments to process vegetable and animal products.
3. Other industry utilizing power and water facilities at the dam site.

1. Services for an Expanding Community

Completion of the project will result not only in doubling of the farm population of the development area, but should result in a more than equal increase in that segment of the population servicing the needs of the farming community and including those engaged in industry, commerce, machine shops, wholesale and retail establishments, and in the professions

including doctors, dentists, and teachers. Inasmuch as the farm lands in the development area now produce lower than normal yields in terms of provincial averages, it is reasonable to assume that aside from partially subsidized services such as education and public health, the service facilities in the area fall below the normal for the province, as an area acquires only those facilities which it can afford.

It is not illogical to conclude, therefore, that the economic activity of the area in terms of service industry, commerce and professional services, will quadruple as a result of the construction of the dam for the following reasons:

1. It is estimated that the farm population itself will double.

2. As the earning capacity of each separate farm unit will be greater than at the present time, the expendable surplus or the purchasing power of each unit will be considerably greater.

3. As the operations of the farms themselves will involve greater mechanization with increased operating costs, not only per acre of land, but also per farm unit, the area will need and be able to support a substantially greater service industry.

4. The development of processing and other industries in the area, with increased population which such activity entails, will result in still further increases in the service requirements of the district.

It is very difficult to accurately assess the extent of increase in service activities in the area, but the experience of communities in the Province of Alberta which have been provided with irrigation facilities, amply justifies the approximate estimate of expansion referred to above.

2. Processing Industries

There is little doubt that the completion of this project will immediately

result in the establishment of innumerable factories for the processing of vegetable and animal products which will be produced in the area. Again we would refer to the developments which have already taken place in the Province of Alberta in irrigated regions, and suggest that a similar, if not greater, development will take place in Saskatchewan.

As most of the produce of an irrigated area is perishable by nature, it must be processed within the economic area. Plants would undoubtedly be constructed to can the many vegetable products which would be produced, such as beans, peas, tomatoes, corn, etc. By the same token it is very likely that a large sugar beet refining plant would be established in the area. Increased production of livestock would in turn result in increased industrial activity in the province, serving to increase the productivity of presently existing meat packing plants in the province and undoubtedly resulting in the establishment of additional plants. It should be recognized that the production of packing plants in any area depends not so much upon the market for their products, but rather upon the supply of animals available for slaughtering.

In addition we should look forward to the establishment of a milk canning plant in the area. Consideration has been given from time to time by national milk canning concerns to the establishment of branch plants in western Canada, and although there is more than an ample market for such a plant on the prairies alone, the establishment of such a plant or plants has been postponed due to the fact that the availability of raw milk in any concentrated area is marginal only, and might not provide sufficient assurance of availability of raw materials to an expanding industry. With the concentration of farming in the development area, linked with an important trend towards dairy farming, the marginal as-

pects of availability of raw material would disappear.

3. Other Industries

The completion of the project will make available two very important industrial facilities which are conditions precedent to the establishment of many important industries, namely, cheap hydro-electric power and abundant sources of industrial water. The lack of these two important facilities has been the principal cause for the failure of a number of industries seeking establishment in Saskatchewan communities. With a continuation of discoveries of oil and natural gas in the area contiguous to the development area, and probably within the area itself, additional incentives will exist for the establishment of industry based on the use of oil and natural gas as fuels and raw materials.

4. Tourism

One of the most interesting developments which should take place, not only from the point of view of economics, but also from the point of view of social benefits, would take the form of the development of an important tourist industry. It is true that Saskatchewan is blessed with a number of beautiful vacation playgrounds, principally north of Prince Albert, as well as at a number of locations in the southern portion of the province. It is equally true to say, however, that the northland is accessible to only a very small proportion of the citizens of the province, by reason of its distance from the majority of the province, together with the time required

and cost involved in vacationing in this area.

Vacation facilities do exist in the southern portion of the province, but these are relatively few in number and again, accessible to only a portion of the population.

With the creation of a lake having a shoreline some 400 to 450 miles long, we can look forward to the creation of a new oasis available equally to the residents of the southwest and west central portions of the province, as well as to the residents of the Cities of Regina, Saskatoon, and Moose Jaw and intermediate farming communities.

Based on patterns already developed in the province, we could also expect a substantial influx of tourists from the United States, impelled by a desire to travel to a foreign land in search of clear, fresh waters well stocked with fish.

5. Conclusions

The completion of the project would result, not only in the physical developments referred to above, but would have an immeasurable stabilizing effect upon the economy of the province, making it less dependent upon its one crop source of revenue, dependent as it is upon national and international factors. Furthermore, it would have a very decided stimulating effect at this period of the province's industrial development, giving encouragement to our own industrialists to expand their present facilities, and providing a greater advantage to outside capital to establish their plants in an expanding province.

Part IV

INTEGRATION AND VALUE OF FARM POWER

Submitted by

J. W. Tomlinson, General Manager,
Saskatchewan Power Corporation

September 11, 1952.

DR. T. H. HOGG,
Chairman,
Royal Commission on the South
Saskatchewan River Project,
Ottawa, Canada.

DEAR SIR:

The Saskatchewan Power Corporation, as the provincial authority responsible for meeting the growing demands for electric power throughout the Province of Saskatchewan, is vitally concerned with the power aspects of the South Saskatchewan scheme.

Not being blessed with natural hydro-electric power sites, we are continuously seeking new power sources especially those which would tend to reduce the overall cost of power.

The load growth on the Saskatchewan Power Corporation system during the last four years has been at the rate of 20% per year compounded. Even with this recent increase (doubling in four years) the per capita consumption in Saskatchewan in 1951 was still very low compared with other provinces, being half that of Alberta and one-seventh that of Manitoba. The greater consumptions in Manitoba and Alberta with the attendant economic benefits, are in proportion to the availability of low cost hydro power.

During the past five years the Saskatchewan Power Corporation has been building a high tension network to bring lower cost central station power from large steam plants to areas formerly served by higher cost diesel plants. These high tension lines are designed suitable for higher voltages to carry future loads. Further reduction in power costs will depend upon the efficient use of the high tension network and the development of lower cost power sources.

The Saskatchewan Power Corporation presents herewith a brief to show that the power from the South Saskatchewan River Project could be effectively integrated with the Provincial Power System, thereby substantially reducing the overall cost of electric power to the consumers of Saskatchewan.

Yours truly,

J. W. TOMLINSON,
B.Sc., E.E., P. Eng., M.E.I.C.,
General Manager,
Saskatchewan Power Corporation.
W. B. CLIPSHAM,
B.A.Sc., P. Eng., M.E.I.C.,
Chief Engineer,
Saskatchewan Power Corporation.

1. Integration of the Hydro-Electric Power with the Provincial Power System

Present planning for the proposed Central Saskatchewan Development calls for an initial generating capacity of 100,000 kilowatts (134,000 H.P.) with provision for additional generating units for an ultimate installed capacity of 150,000 to 175,000 kilowatts (200,000 to 234,000 H.P.). This planning is based on estimates by the Prairie Farm Rehabilitation Administration indicating the availability of 325,000,000 kilowatt hours of firm commercial energy, 50,000,000 kilowatt hours of firm energy for irrigation pumping, and 100,000,000 kilowatt hours of secondary energy.

The power plant will be connected to the provincial high tension transmission system and will be operated in conjunction with steam-electric generating stations in the northern portion of the system and the proposed hydro-electric generating station at Fort a la Corne. The ample water storage facilities to be provided by the Coteau Creek dam will permit great flexibility in the use of the available water, so that the power output can be delivered at times and in quantities most suitable for the efficient operation of the whole system. As will be demonstrated below, the available energy can be utilized with the initial 100,000 kilowatts of installed capacity. However, as the system load increases, more installed capacity will be required to supply demands over peak load periods. The installation of additional generating units at the Central Saskatchewan Development from time to time up to a total of 150,000 to 175,000 kilowatts will provide the necessary peak load capacity at minimum system cost.

By the time the Central Saskatchewan Development can be brought into production (assumed for this study to be

in the latter part of 1963) the contiguous system demand is estimated at 220,000 kilowatts and energy requirements of some 800,000,000 kilowatt hours. There will be available at Fort a la Corne 96,000 kilowatts of installed capacity and 598,000,000 kilowatt hours. There will be steam-electric capacity of 125,000 kilowatts, which will provide the balance of energy requirements. The Central Saskatchewan Development will have an initial installed capacity of 100,000 kilowatts and energy of 325,000,000 kilowatt hours available for integration with the then existing plants.

Table 1 shows how the annual peak and energy requirements can be allocated between hydraulic and steam plants in 1962, and how the Central Saskatchewan Development can be integrated with these in subsequent years. Operation of the Coteau Creek plant will result in the immediate reduction of active steam plant capacity of 44,000 kilowatts, leaving 81,000 kilowatts of capacity as system reserve for emergent use and for load growth. Additional generating units at Fort a la Corne in 1970 and 1974, and additional steam-electric capacity in 1968, 1972, 1974 and 1976 would be necessary to supply peak loads and increased energy requirements. In 1978, 1980 and 1982 the increase in demand and energy requirements could be met by both steam-electric and hydro-electric installations, the former to supply growth in energy, the latter to supplement the former in providing the necessary peak capacity. The hydro installation would be at Coteau Creek.

It will be noted from Table 1 that the full amount of available energy at Coteau Creek was not utilized until 1968. The difference represents the accumulated surplus of monthly availables at Coteau Creek which were not utilized during the high flow periods at Fort a la Corne, owing to rigid adherence in this study

Table 1—Generating Capacity and Peak and Energy Allocation for Interconnected Northern Saskatchewan System

System Requirements				Fort à la Corne			Steam Electric			Central Saskatchewan Development							
Year	Peak Kw. x 1000	Kw. Hr. x 10 ⁶	L.F. %	Installed Capacity Kw. x 1000	Peak Demand Kw. x 1000	Kw. Hr. x 10 ⁶	Load Factor %	Installed Capacity Kw. x 1000	Peak Demand Kw. x 1000	Kw. Hr. x 10 ⁶	Load Factor %	Reserve Capacity Kw. x 1000	Installed Capacity Kw. x 1000	Peak Demand Kw. x 1000	Kw. Hr. x 10 ⁶	Load Factor %	% Total Installed Capacity In Reserve
1962.....	210	790	42.8	96	96	584	69.4	125	114	206	20.6	11	...	...	...	...	...
1964.....	240	917	43.5	96	96	598	71.0	125	44	107	27.8	81	100	100	212	24.2	25.2
1966.....	270	1,060	44.8	96	96	598	71.0	125	74	175	28.0	51	100	100	287	32.6	15.9
1968.....	300	1,200	45.6	96	96	598	71.0	150	104	277	30.4	46	100	100	325	37.0	13.3
1970.....	330	1,320	45.6	128	128	598	53.0	150	102	397	44.4	48	100	100	325	37.0	12.7
1972.....	364	1,452	45.6	128	128	598	53.0	175	136	529	44.3	39	100	100	325	37.0	9.7
1974.....	401	1,600	45.6	160	160	598	42.5	200	141	677	54.7	59	100	100	325	37.0	12.8
1976.....	441	1,760	45.6	160	160	598	42.5	225	181	837	52.8	44	100	100	325	37.0	8.9
1978.....	486	1,936	45.6	160	160	598	42.5	250	201	1,013	57.6	49	125	125	325	29.6	9.2
1980.....	535	2,130	45.6	160	160	598	42.5	275	225	1,207	61.3	50	150	150	325	24.7	8.5
1982.....	588	2,345	45.6	160	160	598	42.5	300	253	1,422	64.3	47	175	175	325	21.1	7.4

to the monthly allocations shown on Table 2. In practice these surpluses could be utilized in subsequent months, or the water could be applied to filling the storage reservoir, since it is unlikely that the reservoir will be completely filled by the time the generating plant is ready for service.

The difference in installed capital cost of steam-electric and hydro-electric units in favour of the latter would make economic the increases in hydro-electric capacity to meet peak demands when sufficient energy is available from steam-electric plants. The steam plants would operate at higher load factors, resulting in lower generating cost per energy unit. Increasing the installed capacity of hydro-electric plants, with no increase in total hydro-electric energy, would increase the cost per energy unit. In general, this process could be continued until the costs per unit were equal, or until a limit was reached owing to water storage capacity, or downstream flow conditions. Coteau Creek plant, with its large pondage, is well suited to operation as a peak load station.

Table 1 illustrates the distribution of peak and energy between plants on an annual basis. The variation in demand from day to day and from hour to hour will affect the optimum allocation of load between plants. The accompanying charts will serve to illustrate the ability of the installations to share the peak and energy requirements of typical daily load curves.

Figure 1A represents a load curve for the peak day in December, 1964, and would be representative of the year's peak. The steam plants would carry a base load of 44,000 Kw. (44 Mw.) at 100% load factor. The Central Saskatchewan Development would supply the balance of demand between 0 and 7:00

hours, and would supply 76,000 Kw. (76 Mw.) continuously from 7:00 to 23:40 hours, except during the period between 16:40 and 18:40 hours when additional output up to the capacity of the station would be utilized to carry the peak load. The Fort a la Corne plant would be operated between 7:00 and 23:40 hours to carry the load variation up to its maximum capacity. The available water for the day would be fully utilized at both hydraulic plants, and the steam plant would operate at maximum efficiency.

The high river flows at mid-year would enable the Fort a la Corne plant to operate on base load. On a peak day in June, 1964, as illustrated by Figure 1B, Fort a la Corne could carry the bulk of the energy required for the day, with Coteau Creek plant carrying the variation during the peak period. No steam-electric generation would be required. Surplus water at the Central Saskatchewan Development could be stored for use during low flow periods.

By 1982 the steam plants would be required to supply the greater part of the energy and would operate continuously at high load factors. The available water would be utilized in the hydraulic plants to fill in the heavily loaded portions of the day. Figure 2A indicates that for the peak day in December, 1982, an installed capacity of 175,000 Kw. (175 Mw.) could be utilized with advantage. The energy requirements from the Central Saskatchewan Development for the peak day are in excess of the daily average for the month. Figure 2B indicates how water can be stored on off peak days by using minimum water from the Development and making up the energy requirements from the steam-electric plants.

Table 2—Monthly Allocation of Hydro-Electric Energy

	Fort a la Corne Kw. Hr.	South Saskatchewan River Project Kw. Hr.
January	28,600,000	29,300,000
February	26,000,000	25,400,000
March	30,300,000	27,000,000
April	53,200,000	24,800,000
May	65,700,000	25,000,000
June	61,500,000	24,200,000
July	63,600,000	24,400,000
August	64,300,000	25,800,000
September	63,800,000	25,900,000
October	66,700,000	29,000,000
November	45,200,000	30,200,000
December	29,500,000	34,000,000
Total	598,400,000	325,000,000

Fort a la Corne—Monthly allocation of energy as in supplement to the 1931 report on Power Development by H. G. Acres for an installed capacity of 96,000 Kw.

Central Saskatchewan Development—Monthly allocation of energy based on the system distribution of energy per month.

Figure 2C illustrates again for June, 1982, the practicability of operating Fort a la Corne on base load during the high flow period, and the storage of water at the Central Saskatchewan Development for later use.

Income:

325,000,000 Kw. Hrs. @ 5.5 mills.....	\$ 1,788,000	
100,000,000 Kw. Hrs. @ 3.0 mills.....	300,000	
		\$ 2,088,000

Costs (on a capital investment of ten millions)

Interest @ 4%.....	\$ 400,000	
Depreciation @ 2%.....	200,000	
Maintenance and operation @ 2.5%.....	250,000	
Contingencies @ .5%.....	50,000	
		\$ 900,000

Annual Saving.....	\$ 1,188,000
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The irrigation pumping energy of 50,000,000 kilowatt hours annually has not been included in the above since it has been specifically reserved for pumping purposes. Initially, and in wet years, the total of 50,000,000 kilowatt hours may not be required for pumping. Whereas energy allotted to pumping and not required might be considered as secondary commercial energy, it could only be valued as such if utilized. Since its

It would be noted that in the above discussion new installations were referred to as occurring in specified years. Actually these installations will be required when loads reach the values shown. The time scale applies only if the actual load growth agrees with the estimated growth.

2. Annual Value of the Central Saskatchewan Development Power to the Saskatchewan Power Corporation

The value of this hydro power is determined by the cost of steam-electric power. For a large steam-electric station the cost has been estimated at 7.5 mills per kilowatt hour. The estimated cost of extra transmission lines and associated losses for the hydro plant is approximately 2 mills per kilowatt hour. The firm hydro power is thus worth 5.5 mills per kilowatt hour. The non-reliable or secondary energy is worth 3 mills (fuel cost less transmission losses) on account of steam plant capacity required for dry periods.

Taking the firm energy at 325,000,000 kilowatt hours and the secondary energy at 100,000,000 kilowatt hours annually, the annual savings are:

use would follow full utilization of the above mentioned 100,000,000 kilowatt hours of secondary energy, and the ability of the system to absorb large amounts of secondary energy would be limited, particularly in the early years, the value of the unused pumping energy is somewhat debatable and has not been included above.

Additional savings would also be realized from the increased power available

from hydro installation downstream from the Central Saskatchewan Development due to the regulated flow. Fort a la Corne would be the only plant from which savings would be realized immediately since it appears probable that it would be completed before the Development. Some of this energy can be utilized without any additional installation so that it could be valued at 5.5 mills per kilowatt hour. The remainder would require additional installed capacity and would be valued at 3 mills per kilowatt hour, i.e., 5.5 mills less fixed charges on the required installation. Assuming that 50% of the 100,000,000 kilowatt hours is recoverable without additional installations, the additional saving would be:

50,000,000 kw. hrs. at 5.5 mills =	\$275,000.00
50,000,000 kw. hrs. at 3.0 mills =	150,000.00
Total	<u>\$425,000.00</u>

CONCLUSIONS

1. The Central Saskatchewan Development will provide pondage and flows sufficient for the operation of a hydro-electric generating station with an initial installed capacity of 100,000 kilowatts, and an ultimate capacity of 150,000 to 175,000 kilowatts, when integrated with other generating plants on a large interconnected transmission system. The installed capacity is not limited by the available supply of water, but by the ability of the system to absorb the available energy to best advantage in competition with other sources.
2. With a 100,000 kilowatt or larger station, there is adequate installed capacity to provide for 34,000 kilowatts of irrigation pumping load during the summer months (see Figure 1B and 2C).
3. Secondary energy, which may be available in years of higher flows can be generated during off peak hours with equivalent reduction in steam - electric

energy and without increasing the installed capacity.

4. Economically the hydro installation at the Coteau Creek dam appears sound with an indicated annual saving over steam-electric generation of \$1,188,000 and indirectly resulting in an additional annual saving of \$425,000 from Fort a la Corne. Electric energy in Saskatchewan is costly in comparison with provinces having hydro-electric power, resulting in an economic disadvantage to the population of Saskatchewan which has the third lowest consumption per capita in Canada. This disadvantage would be reduced by the development of hydro-electric energy sources within the province.

5. The efficient integration of the hydro-electric energy with the generating facilities in the northern part of the Saskatchewan Power Corporation system is demonstrated. The central location of the Central Saskatchewan Development lends itself to integration with the southern portion of the system should such prove advantageous, and is likewise well situated for integration with the system as a whole. It is, therefore, adaptable to trends in load growth which may favour one portion of the whole system more than another.

Table 3—1951 Monthly Distribution of Peak Demand and Energy

Month	% Energy Distribu- tion	% of December Peak	% L.F.
January	9.02	89.3	51.3
February	7.84	82.2	51.8
March	8.30	72.4	56.4
April	7.63	63.2	61.1
May	7.68	63.5	59.6
June	7.45	62.2	60.8
July	7.50	61.5	59.8
August	7.93	66.6	61.5
September	7.95	65.4	61.5
October	8.91	86.5	50.5
November	9.32	95.0	49.7
December	10.48	100.0	51.4
	<u>100.00</u>		

Appendix I

PROCEDURE IN PLOTTING TYPICAL DAILY LOAD AND ENERGY

The monthly distribution of peak demand and energy, expressed in per cent., for the Saskatchewan Power Corporation system for the year 1951 is shown on Table 3. It is assumed that this distribution will apply to subsequent years to a reasonable degree.

The monthly allocation of energy from the proposed Fort a la Corne hydro-electric plant, as determined by H. G. Acres and Company (1946 Supplement to 1931 Report) is shown on Table 2, together with an allocation of available annual energy from the Central Saskatchewan Development based on the 1951 distribution experience. The balance of monthly energy required in any year would be made up with steam electric generation.

A comparison of available hydro-electric energy in months of low water flows with energy requirements indicates that December represents the critical month with respect to the ratio of hydro-electric energy to system requirements. Therefore, from an analysis of the daily load curves during the peak month of December, a load duration curve can be derived to show the number of hours during which a given peak load is equalled or exceeded. From this curve, the graph shown in Figure 4 is derived, which shows the percentage of the total energy for the month which there will be in any given percentage of the maximum or peak demand; e.g., the top 20% of the peak would represent less than 2% of the energy for the month.

A similar graph for the peak day in December is shown in Figure 3.

The required installed capacity for the Central Saskatchewan Development can be determined from the December peak

and energy requirements and reference to the peak percentage curve for December shown in Figure 4.

Thus for 1964, the system peak (Table 1) is 240,000 kilowatts. Assuming 100,000 kilowatts installed capacity at Coteau Creek for trial, plus 96,000 kilowatts capacity at Fort a la Corne, the total installed hydro-electric capacity is 196,000 kilowatts, which is 81.7% of the system peak. From Figure 4, 81.7% of the peak represents 63% of the energy requirement for the month, or 60,500,000 kilowatt hours. Reference to Table 3 indicates that 29,500,000 plus 34,000,000 = 63,500,000 kilowatt hours of hydro energy is available, which is adequate to supply the above requirement of 60,500,000 kilowatt hours. Had the available hydro energy been less than the requirement, it would indicate that the installed capacities were larger than could be fully utilized.

To plot a daily chart such as Figure 1A, the peak for the day (in this case the annual peak) is known in magnitude and is plotted at 100%. The shape of the curve is taken from current experience. The peak percentage curve on Figure 3 was derived from such a daily load curve.

The peak carried by each of the hydro plants and the steam plant had already been established when the installed capacity of the plant was determined.

The 44,000 kilowatt of steam was put on base load. Assuming that the energy available from Fort a la Corne in any one day was equal to the monthly average of 950,000 kilowatt hours a day in December, by trial and error and using Figure 3, the output of Fort a la Corne was fitted into the daily load curve. The Development then had to supply the remaining energy which, for Figure 1A,

amounted to 1,642,000 kilowatt hours. This is more than average daily kilowatt hours available for the month of December, but on off peak days assuming approximately the same output from both Fort a la Corne and the steam plant, very little energy would be required from the Coteau Creek plant. In this way the full capacity of the project can be utilized on peak days during low flows. The allocation of energy for a peak day in December, 1982, shown on Figure 2A, was made similarly.

During high flow months the procedure was changed somewhat in that Fort a la Corne was put on base load,

rather than the steam plant. This meant that the full installed capacity of the plant could not be utilized in later years with the assumption as to the monthly energy available. However, during flood season, water which would otherwise be spilled could be utilized up to the full capacity of the installation with consequent increase in the annual kilowatt hours developed. The daily energy available from the Central Saskatchewan Development was taken as the average for that month and fitted into the daily load curve, keeping in mind that 34,000 kilowatts of installed capacity had to be available for pumping. The steam plant was then required to make up any deficiency.

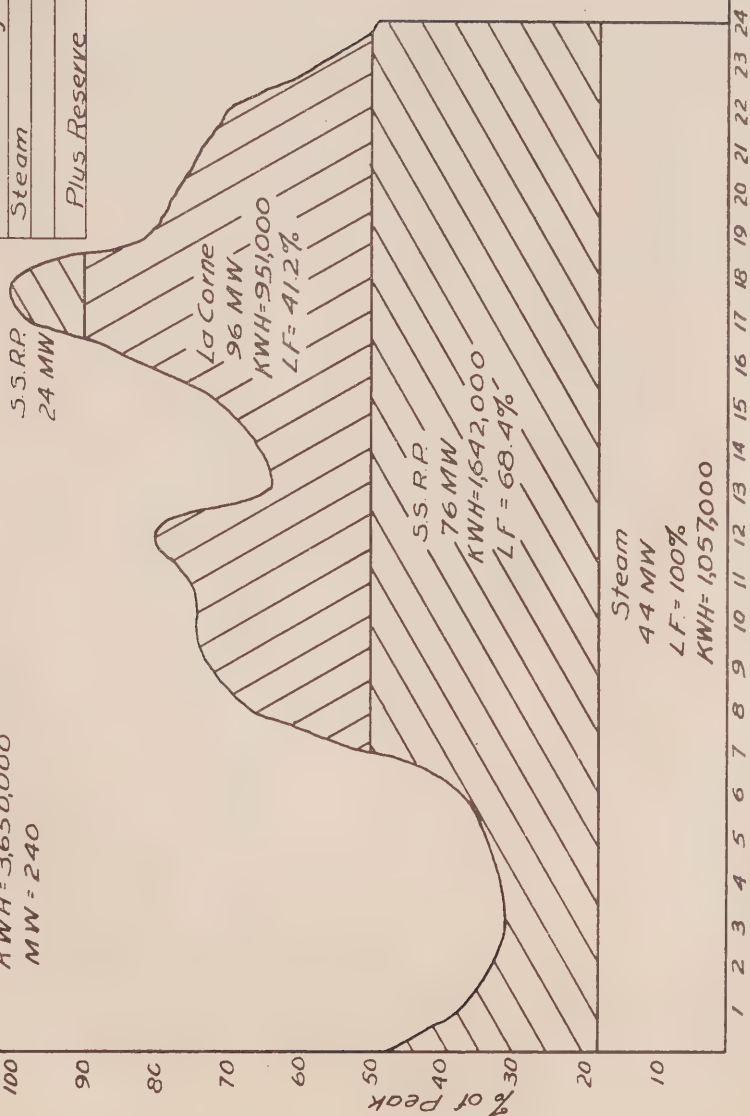
Peak Day-Dec. 1964

Load Factor 63.4%

KWH=3,650,000

MW=240

	Inst	Peak Demand
La Corne	96 MW	96 MW
S. Sask. River Proj.	100	100
Steam	125	44
	321	240
Plus Reserve		81
		321

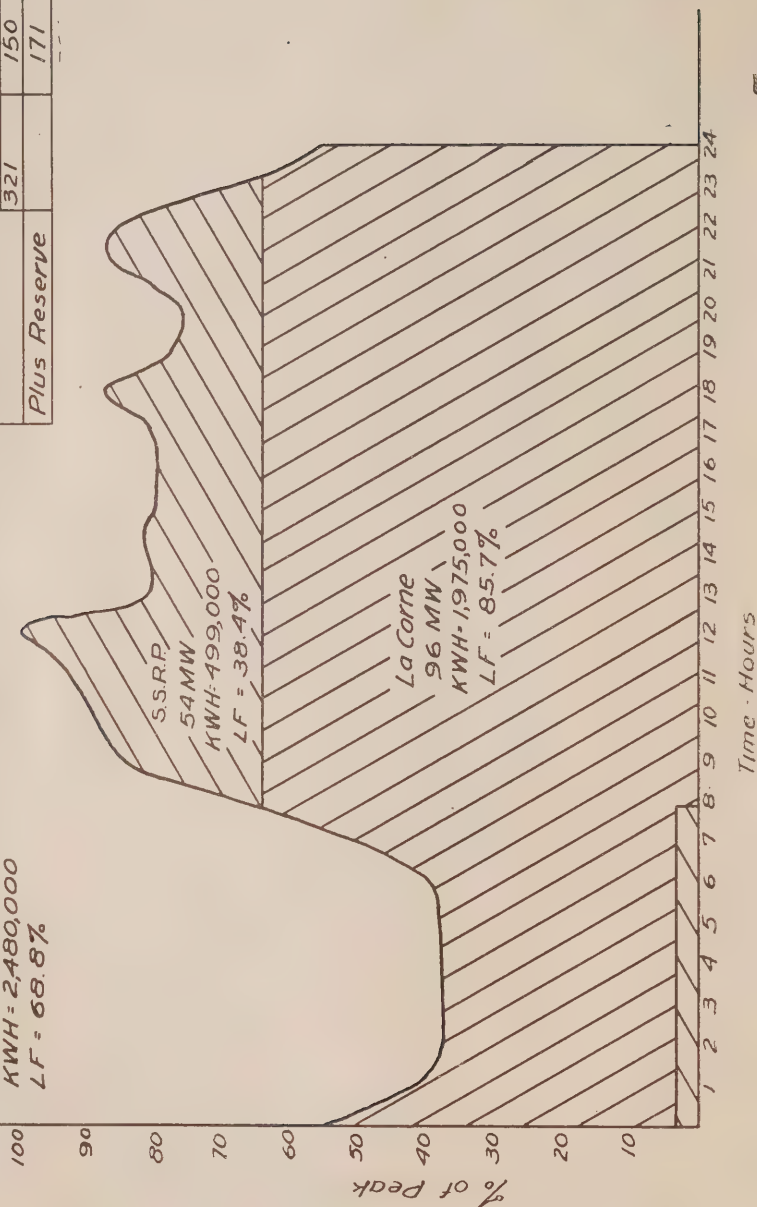


Time = Hours

Figure 1A
May/52

Peak Day - June 1964

MW = 150
 KWH = 2,480,000
 LF = 68.8%



	Inst. Cap.	Peak Demand
La Corne	96 MW	96 MW
S. Sask River Proj.	100	54
Steam	125	
Plus Reserve	321	150
		171

Figure / B
 May / 52

Peak Day - Dec. 1982

KWH = 8,950,000
MW = 588
LF = 63.4%

SS.R.R.
41.1 MW

La Corne
160 MW
KWH = 951,000
LF = 24.8%

SS.R.R.
133.9 KW
KWH = 2,214,000
LF = 52.6%

Steam
253 KW
KWH = 5,780,000
LF = 95.2%

	Inst. Cap	Peak Demand
La Corne	160 MW	160 MW
S. Sask. River Proj.	175	175
Steam	300	253
Plus Reserve	635	588
		47
		635

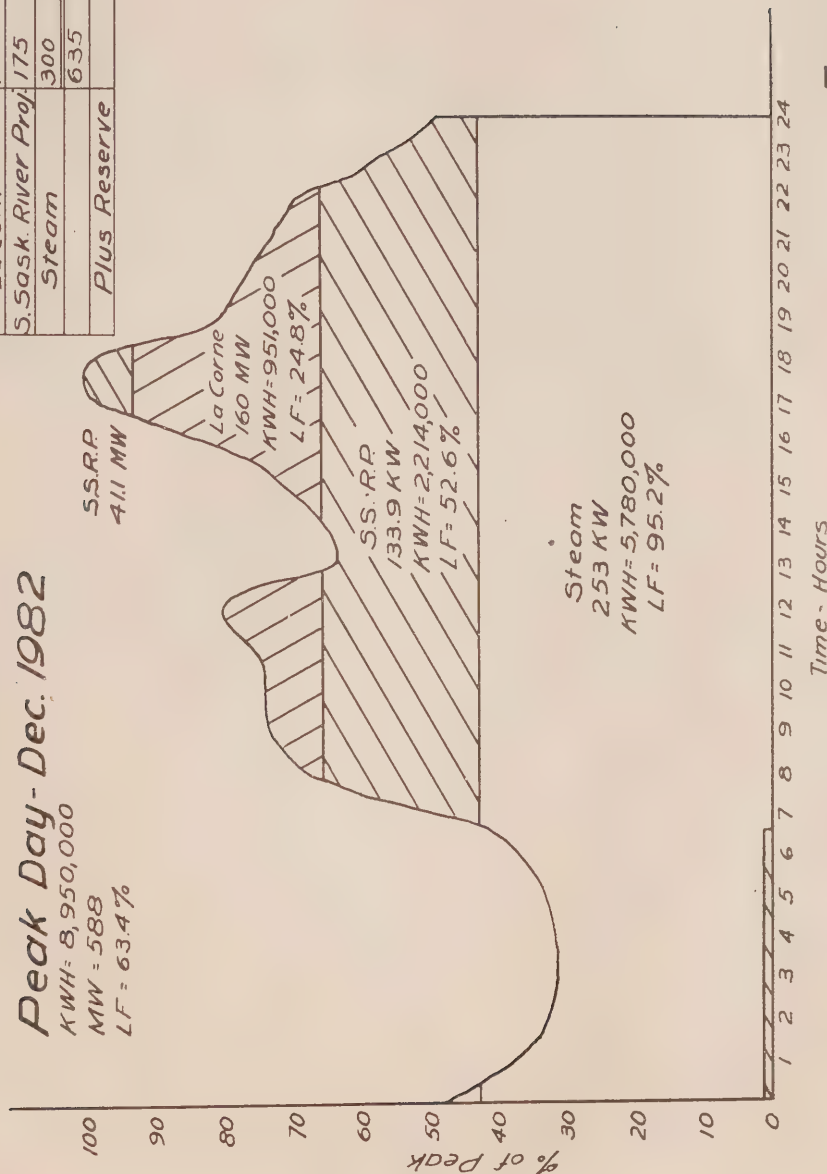


Figure 2A
May/52

Sunday-Dec. 1982

MW = 384
 KWH = 5,969,000
 LF = 64.6 %

	Inst. Cap.	Peak Demand
La Corne	160 MW	160 MW
S. Sask. River Proj.	175	5
Steam	300	219
Plus Reserve	635	384
		231
		635

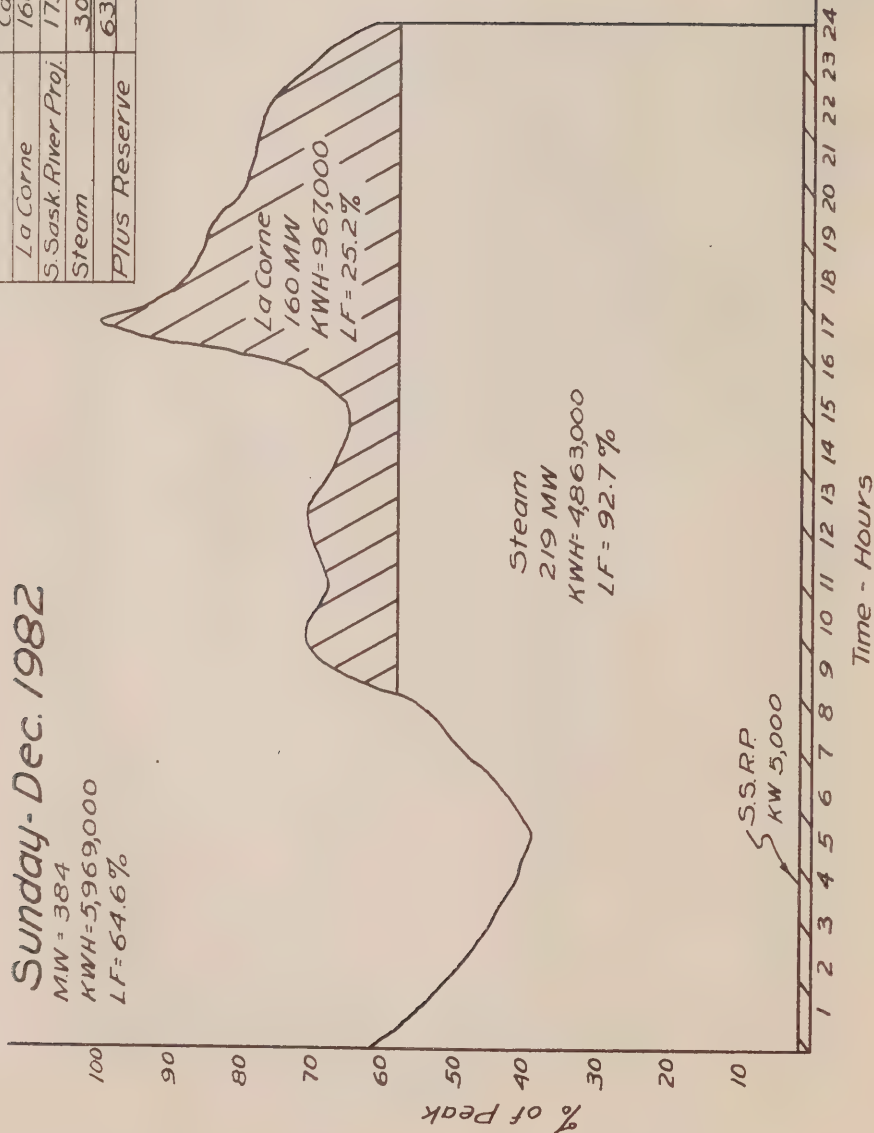
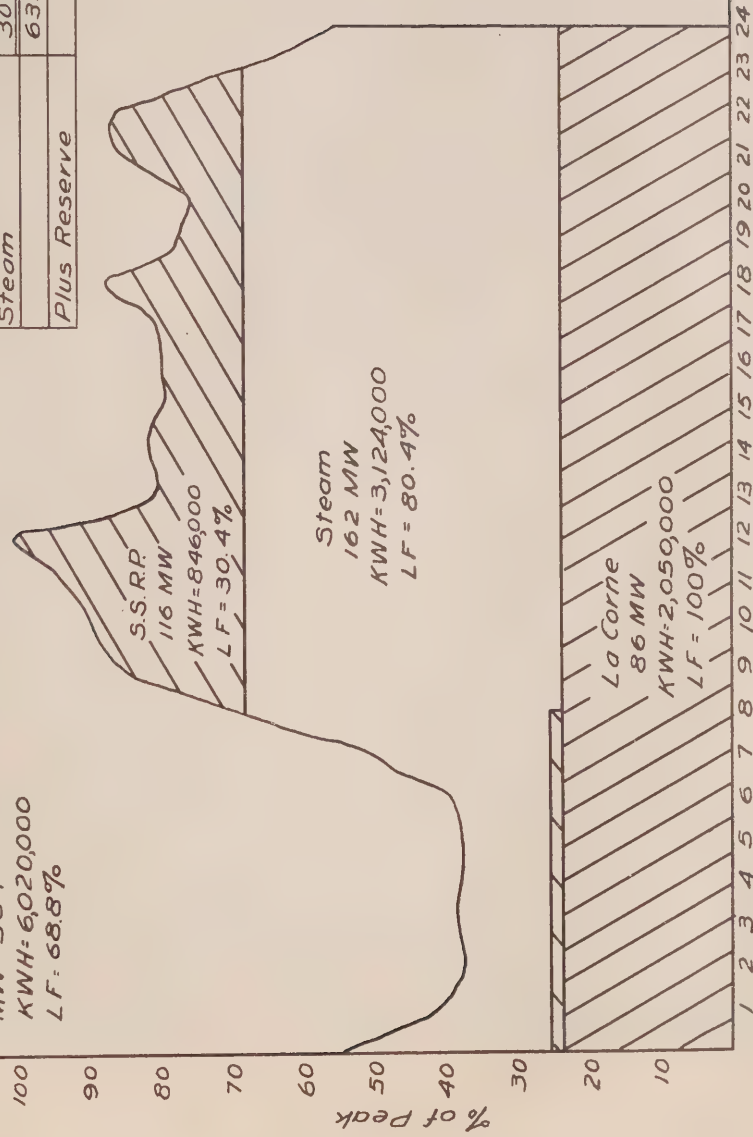


Figure 2B
 May/52 '

Peak Day-June 1982

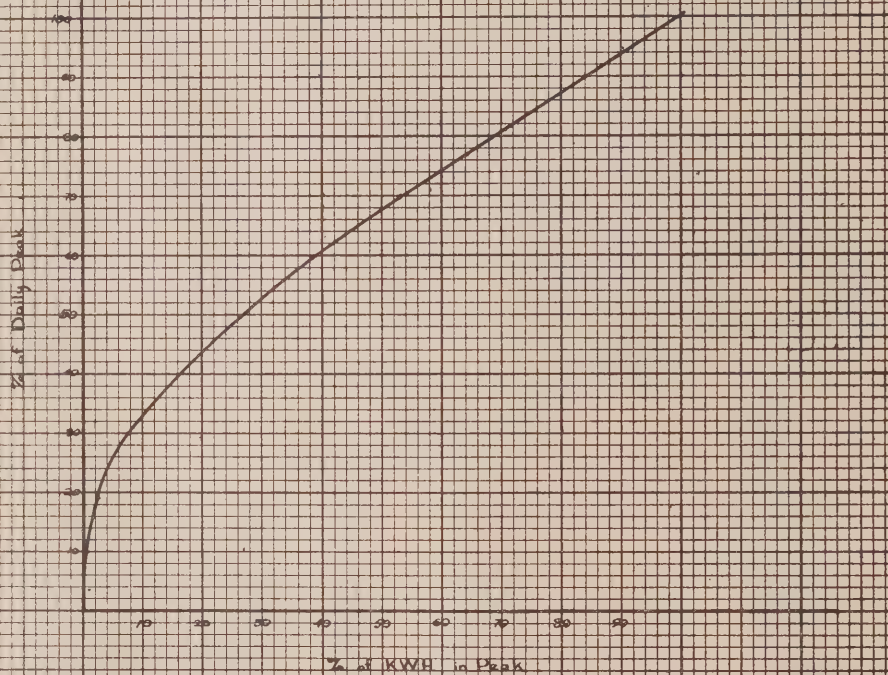
MW= 364
 KWH= 6,020,000
 LF= 68.8%



	Inst. Cap.	Peak Demand
La Corne	160 MW	86 MW
S. Sask. River Proj.	175	116
Steam	300	162
Plus Reserve	635	364
		271
		635

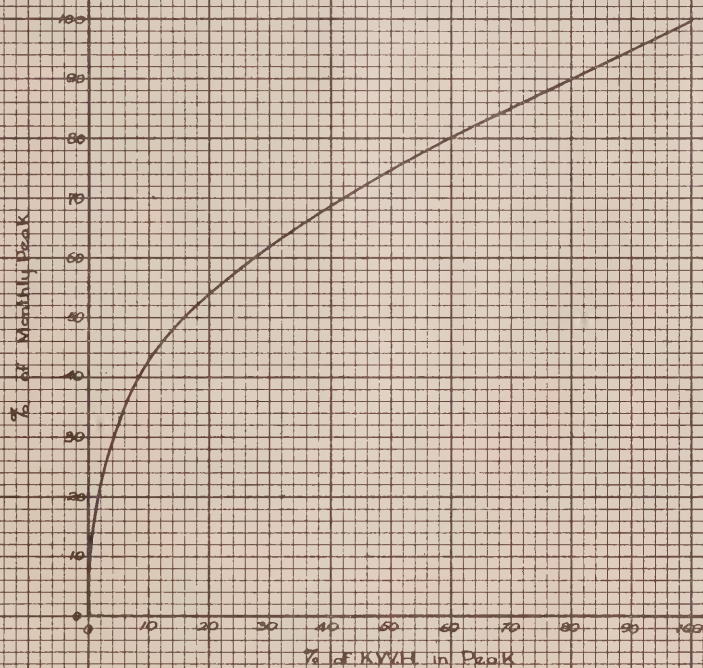
Figure 2C
 May/52

Figure 3
 Peak Percentage Curve
 Peak Day - December
 Load Factor 63.4%



MAY/52

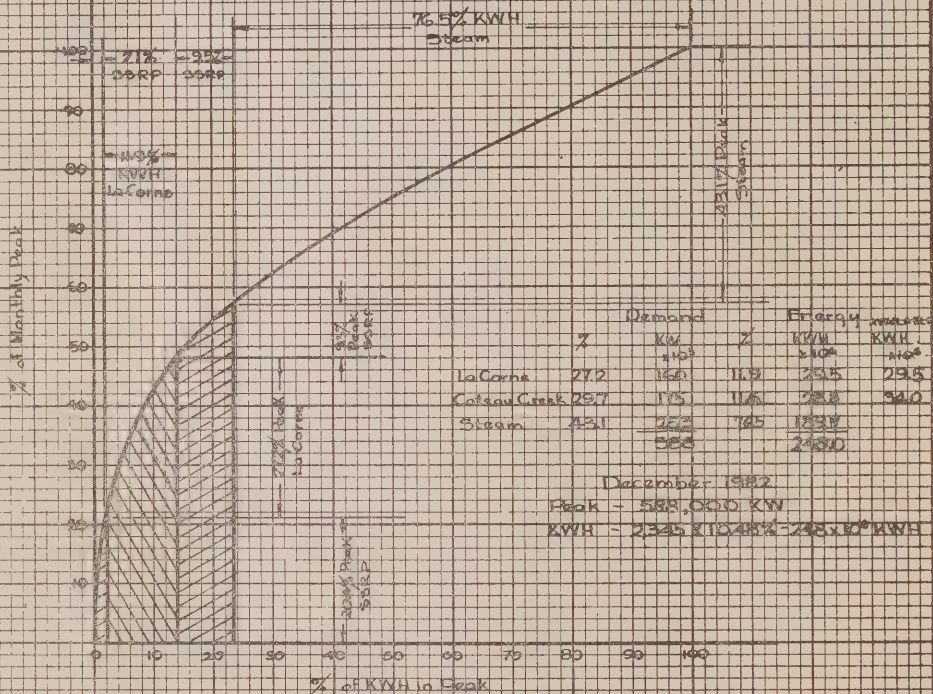
Figure 4
Peak Percentage Curve
Month of December
Load Factor 50%



MAY /52

Figure 5 Determination of Hydro Capacity and Energy Output

Dec 1982 from
Peak Percentage Curves
for
50% Load Factor



Part V

ECONOMIC USE OF WATER

Submitted by

E. J. Scammell, Chief Engineer,
Water Rights Branch,
Department of Agriculture

1. Present Proposals

Of the many proposed developments for the utilizing of the waters of the Saskatchewan River Drainage Basin there are two at the moment which are under discussion and to which a great deal of study has already been given. A comparison of the two proposals is very completely covered in the Prairie Provinces Water Board Report No. 4, prepared in October, 1951, and the advantages of the separate projects generally concurred in by the investigators. However, although a brief reference is made to the comparison of economic use of water no estimate has been made as to what this amounts to in actual quantity. This study then will attempt to assess the value of the two proposals on the basis of economic use of water.

The two proposals are summarized as follows:

(I) THE NORTH SASKATCHEWAN PROJECT—PROPOSAL No. 1

To irrigate some 800,000 to 1,000,000 acres in Alberta and Saskatchewan by diverting water from the North Saskatchewan, Clearwater and Red Deer Rivers. (Note: The original North Saskatchewan Project (the Pearce Scheme) envisaged some 1,400,000 acres irrigable, of which 480,000 acres were in Alberta and 920,000 in Saskatchewan. Later investigation reduced this area by eliminating less suitable lands and areas where costly canals and syphons were required).

(II) TWO SEPARATE PROJECTS — PROPOSAL No. 2

The decision to investigate the irrigation of lands in Alberta and Saskatchewan as two separate projects was arrived at after two independent investigations were made, one by Mr. B. Russell, then P.F.R.A. Senior Supervising Engineer, in 1943, and the other by Mr. S. H. Hawkins, P.F.R.A. Engineer, in 1946.

In his report dated June, 1943, Mr. Russell states in part:

"No surveys have yet been made for a possible diversion of the South Saskatchewan River in Saskatchewan, but certain topographical features and elevations would indicate that it may be more desirable and even economical to irrigate the Saskatchewan area from a point in Saskatchewan rather than by a diversion of the Clearwater, Red Deer and North Saskatchewan Rivers in Alberta. . . .

"Some factors in favour of a diversion in Saskatchewan rather than in Alberta are as follows:

(1) It enables the Province of Saskatchewan to proceed with irrigation development independent of the Province of Alberta.

(2) It brings the point of diversion closer to the irrigable lands in Saskatchewan, thus saving losses in transportation and maintenance costs.

(3) A dam on the South Saskatchewan River will serve as a diversion of water for irrigation and also as a water power development for the generation of power for industry in the province.

(4) The proposed location of a reservoir on the South Saskatchewan River is such that little property damage would result from flooding.

(5) The Calgary Power Company is spending large amounts of money on the Bow River above Calgary to increase the winter flow for power development. This winter flow is available for the development of power in Saskatchewan."

Mr. Hawkins, in his 1947 report on the "Proposed Red Deer River Diversion Project" states:

"During 1946 it was established by the writer, with the aid of field parties, that the difficulties in the way of taking Red Deer Water into Saskatchewan by means of a diversion are very great. A report was made on the proposed Tramping Lake route in August and later the possibility of getting a canal into Saskatchewan at any point south from Macklin to Empress was investigated.

"The conclusion is that this can be done only at one place with any expectation of accomplishing much. This point is the Cabri Lake Summit used by Mr. Strome in 1922, which requires a very long and costly syphon and extremely flat grades which can be used only for very large canals, designed to serve immense acreages. It does not appear that any large area will be commanded west of Elrose, as the Kindersley Tract is extremely flat, has no drainage, and consists mainly of heavy lacustrine type clay, unsuitable for irrigation. It is now proposed to confine the project entirely to Alberta with the principal tracts

centred on Youngstown and Cessford, the estimated total being about 450,000 acres for this highly concentrated area.

"An additional isolated tract of about 50,000 acres lies in the Acadia Valley under Benton Reservoir, bringing the potential total for the project to 500,000 irrigated acres."

These two separate proposals are fully covered in the following reports:

1. South Saskatchewan River Project—Summary Report of Investigations, dated April, 1951. This proposes irrigating about 450,000 acres in Saskatchewan by diversion from the South Saskatchewan River.

2. Proposed Red Deer River Diversion Project—by S. H. Hawkins, dated April,

1947. By diverting the waters of the Red Deer and Clearwater Rivers some 350,000 acres of land could be irrigated in Alberta.

There are two alternatives to the separate projects:

(a) Plus additional water from the North Saskatchewan River into the Red Deer River for the production of additional water power;

(b) Plus additional water from the North Saskatchewan River to irrigate an additional 250,000 acres through the Red Deer Project and to produce additional power.

2. Estimated Canal Transportation and Reservoir Losses*

ESTIMATED CANAL TRANSPORTATION AND RESERVOIR LOSSES*

(i) PROPOSAL NO. 1:

Canals:	Capacity cfs	Length miles
North Saskatchewan River Canal.....	6,800	28
Clearwater River Canal.....	5,500	20
Ardley-Buffalo Lake Canal to Craig Lake.....	10,000	102
Craig to South Saskatchewan Project.....	3,500	500
South Saskatchewan Project Canals.....	various	189
Storage:	Capacity ac. ft.	Area sq. mls.
Buffalo Lake.....	500,000	57.0
Ardley.....	370,000	28.0
Hamilton Lake.....	150,000	28.0
Craig.....	100,000	24.0
Sounding & Grassy Creeks.....	160,000	51.0
Small Reservoir.....	68,000	40.0
Tramping Lake.....	320,000	25.0
Small Reservoirs.....	80,000	40.0
Sounding & Eyehill Creeks River Storage.....	1,748,000 252,000	293.0 30.0
Total.....	2,000,000	323.0 (About 200,000 acres)

*—Canal losses estimated at 6 cfs per million square feet wetted perimeter. Reservoir losses estimated at 21 inches net on reservoir area.

TOTAL ESTIMATED LOSSES FOR PROPOSAL NO. 1:

	Ac. ft.
Canals.....	1,043,400
Reservoirs.....	350,000
Total losses—Proposal No. 1.....	1,393,400

(ii) PROPOSAL NO. 2

Saskatchewan Area (450,000 acres)

South Saskatchewan Project

Storage:	Capacity ac. ft.	Area acres
	8,000,000 (gross)	90,000
	4,000,000 (live)	
Canals—Main & Distribution—Various Capacities—189 miles		
		Ac. ft.
Reservoir Losses ..		157,500
Canal Losses...		111,600
Total ..		269,100

Alberta Area (350,000 acres)

Red Deer Project

Canals:	Capacity	Length
Ardley to Craig	2,700 cfs.	110 miles
Storage:	Capacity ac. ft.	Area sq. mls.
Ardley Reservoir	370,000	28.0
Craig Reservoir	100,000	24.0
Hamilton Reservoir	150,000	28.0
Small Reservoirs	120,000	40.0
	740,000	120.0
		(About 77,000 acres)
		Ac. ft.
Canal Losses		130,000
Reservoir Losses...		135,000
Total ..		265,000
TOTAL LOSSES—PROPOSAL NO. 2:		Ac. ft.
South Saskatchewan Project..		269,100
Red Deer Project..		265,000
Total Losses ..		534,100

3. Comparison of Losses

To put both proposals on a comparable basis, i.e., ultimate development and maximum benefits for each province in acres

irrigated and power generated (see Prairie Provinces Water Board Report No. 4) then we find the following advantages of having separate projects:

	Ac. ft.
Total losses —Proposal No. 1 (Combined Project)	1,393,400
Total losses—Proposal No. 2 (Separate Projects).....	534,100
Difference.....	859,300

There have been alternative routes suggested for bringing water into Saskatchewan. The most recent is referred to in a report prepared in June, 1952, by the Hydrology Division of the P.F.R.A. on

“Full Development Possibilities in the Saskatchewan River Basin.” It is believed by an extension of the main canal of the Red Deer Irrigation Project, crossing into Saskatchewan near the Town of

Loverna, some 200,000 acres of additional land could be served in the Kindersley, Kerrobert and Rosetown areas. However, it is known that the soils in parts of these additional areas are not suitable for irrigation and reference is again made to Mr. S. H. Hawkins' report of 1947 on the proposed Red Deer River Diversion Project:

"It does not appear that any large area will be commanded west of Elrose, as the Kindersley Tract is extremely flat, has no drainage, and consists mainly of heavy lacustrine type clay, unsuitable for irrigation."

In the Alberta Government Brief to the Royal Commission it was suggested that this canal could be extended to spill water into Tramping Lake where it would then be on common ground to the northern route of the original North Saskatchewan (Pearce) Project.

If this alternative route is feasible, then the length of canal necessary to carry the water to the South Saskatchewan Project might be reduced by 100 miles. It could result in a proportionate reduction in transportation losses of about 20%, equal to about 120,000 acre feet of water. This would be offset to some extent by the losses in an enlarged canal system required to carry the additional water from the North Saskatchewan River to irrigate these 200,000 additional acres, and by increased storage losses due to the addition of the Sullivan Lake and other smaller reservoirs.

The net saving between Proposal No. 1 and No. 2 would consequently be reduced to 859,300 acre feet - 120,000 acre feet = 739,300 acre feet.

The advantages in favour of Proposal No. 2 (separate projects) may be summarized as follows:

1. A saving in transportation losses of between 700,000 and 800,000 acre feet of water.
2. Operation and maintenance problems will be reduced considerably. The

larger and more extensive an irrigation project becomes, the more difficult it is to operate it. Maintenance troubles on long canals could be serious. Since the combined project would be operated in two different provinces, no savings on administration expenses could be expected. Mr. Victor Meek, Director of Water Resources Division, Department of Resources and Development, Ottawa, in a letter dated February, 1944, stated:

"I have always been a little skeptical of the feasibility of the original North Saskatchewan Project largely on account of its cost, unwieldy size, and the practical difficulty in including lands within two provinces in one development."

3. More than four times as much storage available, thereby providing greater insurance against drought years.
4. Almost complete stream regulation for Saskatchewan and Manitoba, will afford greater measure of flood control.
5. Increases very considerably available hydro-electric energy by bringing into existence power sites on the South Saskatchewan River. (See P.P.W.B. Report No. 4.)
6. Makes most beneficial use of South Saskatchewan River waters for irrigation purposes. Practically the whole of the flow of the South Saskatchewan River can be utilized as against only about 20% under Proposal No. 1. After taking care of prior commitments in both Alberta and Saskatchewan and making allowances for the proposed Red Deer Project there will be approximately 5,000,000 acre feet of water available in the South Saskatchewan River in an average year. If not utilized to irrigate lands through which it flows in Saskatchewan, this water will continue un-

diminished to the ocean and be completely wasted.

4. Conclusions

The Government of Saskatchewan wholeheartedly supports any proposal which will fully utilize the water resources of the Saskatchewan River Basin. In the original No. 1 proposal (William Pearce Project) some 680,000 additional acres of lands in Alberta and Saskatchewan were included as irrigable. These lands can only be served by diversion from the North Saskatchewan River. Therefore, any other available sources of supply which can be found which will reduce the demand on the North Saskatchewan River cannot be ignored.

The South Saskatchewan River has that available supply and furthermore it places the water naturally right where

it is required, with consequent savings in large transportation losses, and it also makes available large supplies of hydro-electric power which otherwise would be an absolute loss.

If the waters of the Saskatchewan River Basin are to be put to the most beneficial use then ultimate development must include full use of the South Saskatchewan River water.

The South Saskatchewan River Project is the answer to that. The development of that project would not be inconsistent with the proposed full development in the Saskatchewan River Basin. It can be constructed as an independent unit and will not affect the development of other projects in the Basin.

There would appear to be no logical reason therefore in delaying the construction of the South Saskatchewan River Project.

Part VI

STATEMENT OF COUNSEL FOR SASKATCHEWAN

IN REPLY TO THE

SUBMISSION OF THE PROVINCE OF ALBERTA

Submitted by

Harold W. Pope, Q.C.,

Counsel for the Province of Saskatchewan

There appears to be no question but that in order to stabilize the economy of the Province of Saskatchewan, it is necessary that our water resources be utilized to provide a large area of irrigation in the central part of this province.

In considering irrigation projects in the national interest, consideration must be given as to where such projects should be located. Federal expenditures for irrigation can be justified only if they result in national benefits.

In dealing with this question, Mr. Roy E. Huffman, Associate Professor of Agricultural Economics for Montana State College, in his paper entitled "Economics of Irrigation Development," stated:

"In brief, long-term public policy with respect to irrigation development involves determination of *how* much irrigation development there should be, *when* it should be developed, and *where* it should be developed. Unfortunately, it involves the difficult problem of submerging local, sectional, and regional interests each to the larger public interest. It is necessary, however, to a sound national programme for the conservation, development, and use of resources."

It is one of the responsibilities of the Commission to determine whether the proposed South Saskatchewan River Project represents the most profitable and desirable use which can be made of the physical resources involved. In this connection, the Province of Alberta in its submission made to the Commission has suggested an alternative proposal. The proposal submitted by the Province of Alberta suggests the irrigation of certain lands in Alberta by a diversion in that province and the servicing of certain lands in the North Western part of Saskatchewan by such diversion and the extension of the project to service lands which are contained in and part of the South Saskatchewan River Project.

The Alberta proposal requires no further investigation to ascertain if it

would be suitable as an alternative project.

A similar proposal has already been considered, studied and rejected as unsound as a project for the servicing of the lands in Central Saskatchewan. It was because of this that the South Saskatchewan River Project was first considered. Years of investigation have resulted in a favourable report on the feasibility of the South Saskatchewan River Project. This project was not only thoroughly investigated by the P.F.R.A. Engineers but outstanding consultants were retained to advise on all aspects of the project. A comprehensive report in great detail has already been made to the government.

The project as proposed by the Province of Alberta, is a project for the utilization of a small part only of the waters of the South Saskatchewan River augmented by the water required for this project by a diversion from the North Saskatchewan River.

With all due respect, it is a submission which is provincial in its outlook and disregards entirely three very important factors, namely:

1. The great loss of water through evaporation and seepage that would result through the operation of a canal, 400 to 500 miles in length.
2. That the average natural annual flow of the South Saskatchewan at the proposed point of diversion in Alberta is only 1,350,000 acre feet as compared to 7,610,000 acre feet at Outlook.
3. That the net loss of water under the Alberta proposal would provide almost the entire irrigation requirements of the South Saskatchewan Project.

The Commission is charged with the responsibility of determining the most profitable and desirable use which can be made of the physical resources in-

volved. Certainly, there is no alternative to the South Saskatchewan River Project which can measure up to the profitable and desirable results which can be obtained from a national point of view. The waters which flow in the South Saskatchewan River are a great national asset. These waters should be utilized to give the greatest possible national benefit to Canada. The Alberta proposal would result in a great part of the waters that flow in the South Saskatchewan River being permitted to run to the sea without rendering to the Nation any commercial return. The ultimate development of the Saskatchewan River Basin will result in the waters of the North Saskatchewan being utilized to service certain lands in Alberta and Saskatchewan, but the entire benefits of the South Saskatchewan River can be realized only by the construction and development of the South Saskatchewan River Project in the Province of Saskatchewan.

The water losses which would result by the construction of an overall Alberta-Saskatchewan development as suggested by the Province of Alberta would be tremendous. It has been estimated that these losses would amount to 1,393,400 acre feet annually. These losses, it will be noted, are as much as the entire flow of the South Saskatchewan River at the point of diversion of the Red Deer River in Alberta, which has been recorded as 1,350,000 acre feet. This means that the waters that are to be actually required for the proposed project must come from the North Saskatchewan River, and, possibly, if sufficient water cannot be obtained from that source, from the Athabasca River. Surely, the waters from these two rivers can be utilized to greater advantage in Alberta and in Western Saskatchewan, without being called upon to service lands which

can be so easily provided with water from the South Saskatchewan River, which flows right to the place where it is required in Central Saskatchewan. Surely, the water resources of Canada which flow in the North Saskatchewan and in the Athabasca River should not be depleted, and wasted when there is available water in the South Saskatchewan River to the extent of over 5,000,000 acre feet, after providing for all requirements of the Province of Alberta to service their present projects, which if not used, will flow to the sea without rendering to this nation the benefits which could accrue through the beneficial use of this great resource.

Irrespective of the great losses that would accrue to the Nation as a result of the use of the North Saskatchewan water and the waters of the Athabasca River as proposed by the Province of Alberta, it is very doubtful indeed if these waters could be economically brought to the place where the water is so badly needed in the central part of the Province of Saskatchewan, or at all. Suffice it to say that the cost of maintaining a canal of 400 to 500 miles in length would be tremendous and the administration and the maintenance of such a canal would present great difficulties and almost unsurmountable problems.

The Alberta proposal fails to use the great part of the waters under reference. It disregards entirely the development and utilization of the South Saskatchewan River Basin. The Alberta proposal would use the entire flow of the South Saskatchewan River at the point of diversion on the Red Deer, but would obtain the greater part of its requirements from the North Saskatchewan River. The amount of water required would be much greater than that required for the South Saskatchewan River Pro-

ject. In fact, the increased water losses of a combined project would amount to 859,000 acre feet, which would provide almost the entire irrigation requirements of the South Saskatchewan River Project, which amount to 960,000 acre feet.

On the other hand, the South Saskatchewan River Project is the logical step in the development of the entire drainage basin. It does not effect in any way any contemplated development upstream, including the Red Deer Project. At the point of diversion in Alberta the entire average annual flow of the Red Deer River is only 1,350,000 acre feet. This flow remains available to Alberta even after full development of the South Saskatchewan River Project. The South Saskatchewan River Project is a multiple purpose project providing not only irrigation, but power, steam regulation, flood control, an assured domestic water supply, and other uses. It creates a great storage reservoir right in the centre of the dry belt and makes possible, as nothing else could, the stabilization of one of the most depressed areas in Canada. The water resources of the nation must be developed in such a way as to benefit the entire nation. Already the economy of the Province of Alberta has been stabilized by reason of the development that has taken place in that province through the expenditure of federal monies. Already the resources of the South Saskatchewan River have been utilized by the Province of Alberta; but in Saskatchewan there has been no development. Saskatchewan is the only place where this development should be made in the interest of the entire nation *at this time*, not only because Saskatchewan needs irrigation but because by giving to Saskatchewan, the use of this great national resource the economy of this part of Canada will be stabilized and the nation will benefit.

The Saskatchewan River is an inter-provincial stream. It flows from Alberta into Saskatchewan and thence to the Province of Manitoba. The resources provided by this great river must be utilized in such a way as to develop all of the territories through which this great river flows. It would not only be unjust to Saskatchewan but detrimental to the nation if part of the waters of this great river were not utilized in the Province of Saskatchewan.

Disputes have arisen, not only between provinces and states but between nations regarding the utilization of waters that are interprovincial or international in character. It is unnecessary that we consider the law which applies to these interprovincial streams, because we have a Prairie Provinces Water Board which allocates the water between our provinces, but in the United States of America, disputes have arisen between the different states of that great nation as to the use of water and litigation has resulted because of the claims made by one state against another. Their water law there has, however, been definitely settled by litigation and "equitable apportionment" has been the basis for settlement of disputes in that country. In the case of New Jersey versus New York, 283, U.S. 336, 342, Mr. Justice Holmes of the Supreme Court of the United States said this:

"A river is more than an amenity, it is a treasure. It offers a necessity of life that must be rationed among those who have power over it. New York has the physical power to cut off all the water within its jurisdiction. But clearly the exercise of such a power to the destruction of interests of lower states could not be tolerated. And on the other hand equally little could New Jersey be permitted to require New York to give up its power altogether in order that a river might come down to it undiminished. Both states have real and substantial interests in the river that must be reconciled as best they may be. The different traditions and practices in different parts of the country

may lead to varying results but the effort always is to secure an equitable apportionment without quibbling over formulas."

The Boundary Waters Treaty between Canada and the United States of America embodies this principal. "Equitable apportionment" was the basic rule behind the division of the St. Mary and Milk Rivers. What is reasonable, right, fair and just must ever be the controlling principle in order to reach the correct solutions of such controversies, not only between provinces but between nations; but more than that, in this case the national interest must prevail, and it is in the national interest that there be justice in determining the uses of a great national resource and in seeing to it that Federal monies are expended towards the development of a national resource in such a way as to stabilize

all parts of the nation and to see that the most profitable and desirable use is made of the physical resources involved.

It was from this point of view that the Prime Minister of our country, The Rt. Honourable Louis St. Laurent, referred to the proposal to build the South Saskatchewan River Project when he spoke in Parliament on the 28th day of June, 1952.

It is respectfully submitted that the economic and social returns to the Canadian people on the investment in the proposed South Saskatchewan River Project would be commensurate with the cost thereof, and that the said project represents the most profitable and desirable use which can be made of the physical resources involved.

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